

Commentary 23 on  
Karl Jaspers Forum, Target Article 26, 18 April 2000

THE HARD QUESTIONS: VIEW FROM A SCIENCE WITHIN CONSCIOUSNESS  
By Amit Goswami

## SCIENCE WITHOUT CONSCIOUSNESS: COLLAPSE OF REASON

*by Paul Jones*

1 September 2000

### INTRODUCTION

First, I did not intend to interfere with the discussion between two theorists of same ilk, Goswami and Sarfatti, since, so far, I can hardly find anything worth commenting in their special conceptualizations. However, some of my friends got confused by Amit Goswami's books, which they could not properly understand, being not much versed in either physics or philosophy. I felt the necessity to disclose the tricks used by some writers to fool naive readers, who are apt to give the author credit for whatever they do not grasp in their writings, yielding to the pressure of science-looking terminology and abundance of references. An honest person usually takes for granted that the others are as honest, never expecting any fraud on their side. It is the duty of those who can observe the deception, to bring it to light.

One more motive for submitting this comment came from that, personally, I do not like when somebody's creativity is rudely dismissed on the ground that the author is "obviously not a physicist" (Sarfatti), or not a philosopher, not an artist etc. Quite often amateurs differ from professionals only in their ability to sell their product, but not in the deficiency of the product as such. On the other hand, both Goswami and Sarfatti are nothing but amateurs in the areas they discuss (I am going to show that below, in Goswami's case), and they can hardly expect anybody respect their thoughts more than appropriate.

This comment is not addressed to Goswami (Swift) or Sarfatti, since, if they are under the veil of delusion, words can hardly help, and if they are swindling, there is no need to help. I hope to make a modest contribution to the spiritual resistivity of those who have not yet been trapped in pseudo-scientific and quasi-philosophical sophistry of the writers like that.

To make it clear, I do not deny the presence of certain interesting ideas in Goswami's (or Sarfatti's) works, since they reflect a number of objective tendencies in cultural development. It is the perverted way of their presentation and identification with an essentially retrograde position that must be criticized. Provided there are no better books, one might use Goswami's writings as a departure point for more productive thought – similarly, nothing prevents one from coming to the relativity theory or genetic engineering starting from the Bible.

This exposition of the numerous faults of Goswami's/Sarfatti's writings happens to be rather lengthy due to extensive quotations – however, I have to do that to illustrate their poor competence in the area they penetrate, and the techniques they use to disguise that. In the first section, I give a (very incomplete) list of typical sleights of hand; the second section demonstrates that Goswami has rather vague notions of physics in general and quantum physics in particular (despite all his teaching experience). The next section is to indicate the poor kind of philosopher Goswami appears to be. Then I spend some space to show that Goswami's article has nothing to say about consciousness. In conclusion, I grieve about the objective circumstances that favor the proliferation of obscurant teachings like that.

## ART OF ARTIFICE

In this section, I would simply list a few typical methods used to deceive the reader and produce the impression of profound thought. Almost any writer (including myself) can find the traces of such swindling techniques in their texts, and it is impossible to entirely exterminate them from the practice of human communication without a complete reorganization of the cultural core of the society. The more important is exercising everyone's ability to separate the content of any work from its deceptive ornamentation.

### 1. *Term substitution*

Traditionally, logic demands that any discourse would obey the principle of identity: one must use the same set of markers for the same object throughout the argument. In a wider context, one would speak about the integrity of any product, which determines it as a product of a particular activity serving a definite purpose. That is, there must be something in the end, rather than idle browsing from one idea to another, without knowing where to arrive; the latter way is more appropriate for animals, not for conscious beings. This criterion, for instance, can be used to distinguish a work of art from mere exercising certain skills. In the present context, I will only be concerned with term definition and usage in a written/spoken text.

There are many kinds of term substitution. In the most evident case, the same word or phrase is used in different sense in different parts of the text. For example, Goswami writes:

“...material realist view (the ontology that everything arises from matter and its correlates, energy and fields).”

The word “matter” is first used as a correct characteristic of materialism, where that philosophical category denotes the world as it exists on itself, without any recourse to consciousness; in the end of the phrase, however, mentioning energy and fields substitutes this meaning with another: matter in the narrow sense, mass.

Another example is provided by the arbitrary use of the term “measurement”, which can, depending on the context, designate anything at all (except, possibly, measurement proper).

Most physical terms are used by Goswami in that frivolous manner; for instance, Goswami's “coherence” may refer either to the superposition of pure states, or to the so called coherent states in many-particle systems, or merely serve as an alias for any collective effects at all.

Similarly, the word “experience” is used either as a reflection of the world in the subject or cerebral traces of the body's interaction with its environment, or self-experience, or awareness, or feeling, or something reported, etc. This is not evident (and even doubtful) that all these meanings can be covered by the idea of experience. The natural ambiguity of the English language succors many such shifts of meaning.

A more advanced technique is implicit term substitution, when a common term is used to refer to an object that has never been explicitly named. Thus, in the phrase: “Is there an unambiguous way to discern between a quantum and a classical computer model of cognition?” – Goswami implies rather narrow classes of “quantum” and “classical” models rather than any application of classical or quantum mechanics in the study of consciousness. Further, speaking about “masking” the words with “patterns”, Goswami does not specify the kind of masking, which is essential for interpreting the experiments described.

For another example, both Goswami and Sarfatti speak with enthusiasm of non-locality – and they do not agree with each other since they mean different things by that.

Also:

“Incidentally, the experiments of neurophysiologist Benjamin Libet and his collaborators (1979) have demonstrated that there is almost half a second of time delay between the primary event of quantum collapse and our verbal awareness of the event.”

One can be quite sure that nobody has ever dealt with any “collapse” in a usual psychophysical experiment based on latent time measurement. The mystical “collapse” is implicitly substituted for something ordinary and understandable.

And:

“So far, I have dealt with only one of the two ontological problems with the conventional approach to consciousness.”

That is, Goswami takes a particular approach and calls it conventional (later, he blabs it out: “conventional cognitive science”). There are many other approaches thus ignored.

## **2. Identification**

Identification can be considered as a sort of implicit term substitution, when a few terms are used as synonyms, referring to something that is not commonly associated with these terms.

It is quite normal for human thought to discover similarities in apparently quite different things. However, an honest author would explicitly stress every instance of establishing such a relation, drawing the audience’s attention to it rather than distracting it. This is especially characteristic of the arts, with their inclination to bright metaphors. In science, metaphorical word usage must be properly conditioned; in philosophy, it can only occur as an explicit scheme, that is, with an indication of respect, in which the two things can be identified. Without that, any identification becomes a swindling instrument.

Goswami’s text contains numerous identifications. Thus, he writes:

“But in unconscious (subliminal) perception, in which consciousness but not awareness is present...”

In this phrase, the unconscious is identified with the subliminal, which is not a widely acceptable choice. Using this truncated term in other context, Goswami is bound to encounter conceptual difficulties, and his attempts to overcome them inventing yet another arbitrary construction may only cause a pity for a person who cannot see real problems and hence makes his best to get stuck in artificial ones. This is what the hard problem of consciousness really is: lack of consciousness in a conscious being.

More examples:

“But in material realist cognitive science...”

Cognitive science is identified with naive materialism, which is not necessarily valid.

“This includes our brain-mind.”

The mind is identified with the brain in a manner quite characteristic of cognitive science.

“So the mental world is a whole, or what physicists sometimes call an infinite medium.”

The whole does not need to be infinite, and an infinite can be not whole.

“A well-known characteristic of learning is that learning a performance...”

Learning is identified with learning a performance (and this latter gets further identified with mere conditioning, in an animal way).

“Yet the subject consciousness of the experience (the subject pole with the qualia of experience)”

Judging by the public argument around “qualia”, nobody can tell what they could be and whether the very term makes any sense; here, Goswami replaces one poorly defined term with another as obtuse.

“The current model, with two separate substances that are connected via consciousness which simultaneously collapse parallel actualities in both bodies, gives a mechanism for psycho physical parallelism. However, the new model is different from the old psychophysical parallelism in the sense that experience modifies both bodies as states of the two bodies become correlated by experience.”

First the role of a mediator between two (artificially divided) “bodies” is given to consciousness, and

then the same role is said to be played by “experience”, whatever is meant by that.

And finally, a whole basket of intertwined identifications:

“The programs of the mind can be simulated by computer algorithms, hence the temptation of assuming that mind is reducible to matter, and *mind is brain*.”

The mind is identified with some computing device, mind models are identified with the mind, and matter identified with the brain.

### 3. Arbitrariness

To allow easy term substitution and identification, it is convenient to avoid definitions and explication of any specific constructs produced by the author, so that they could be assigned any property needed to support the author’s ideas at any moment.

In Goswami’s texts, such terms as “consciousness”, “object”, “subject”, “collapse” etc. are never properly defined, which makes them easy to manipulate, to achieve the a priori chosen conclusion.

“This has been corrected in quantum functionalism in which consciousness is defined to transcend both matter and mind.”

Since there have been no definitions, consciousness is declared to be “transcendental”.

“But then where does the purposiveness of mind come from? Logic dictates that only consciousness can inject purposiveness in the world.”

Consciousness is arbitrarily ascribed the property of “injecting”, whatever it means or does not mean.

“And yet the subtle substances can communicate with the physical substance through the intermediary of consciousness.”

Goswami arbitrarily introduced “consciousness”, “subtle substances”, “physical substance”, and “communication” – as arbitrarily, he joins them in one sentence.

“How does an electrical impulse pass from one neuron to another across a synaptic cleft? Conventional theory says that the synaptic transmission must be due to chemical neurotransmitters. E. H. Walker (1970) thinks that the synaptic cleft is so small that quantum tunneling of electrons may play a crucial role in the transmission of nerve signals. Eccles (1986, 1994) has discussed a similar mechanism for invoking the quantum in the brain – his *microsites* that mediate the quantum connection between neurons at the synapses do seem to satisfy the small-mass requirement of quantum behavior (Herbert, 1993).”

A good example of how people invent daemons to settle them in a pinhole.

“The latest entry in this field is the work of Hameroff (1994) who sees this coherent build-up in the structure of microtubules within the brain cells (see also, Penrose, 1994).”

One can design as many arbitrary models as one likes, but they cannot pretend to be anything beyond mere play of the mind, and there is no special need for them in the neurophysiology of the brain, and even less in studying consciousness.

“But in the case of the correlated brains,”

No idea of brain correlation has been discussed in the text, and one can understand (or rather not understand) this phrase in any likely and unlikely way.

“Because consciousness of the experience transcends the brain-state of the quantum/classical ensemble,”

One entirely arbitrary statement...

“the latter is clearly an incomplete description of the experience.”

...implies another, as arbitrary.

“Because consciousness may choose to collapse identical possibility waves simultaneously in two correlated locally-separated observers.”

And no word about why it happens to “collapse” in 1/4 cases only, and not in the other 3/4 cases...

“What is the difference between gross physical and subtle substances? One big difference has to be the grossness of the macroworld of our shared perception in the physical domain.”

What is “grossness” or “subtlety”? One can assert anything about that. Thus, in the thesaurus of MS Word (press Shift-F7 with the cursor on the word), one might find “debility” as a synonym for “subtlety”, and “savageness” as a synonym for “grossness”...

“It may, indeed, be evidence against a homunculus, as Eccles assumes, because the homunculus has the right representation still available to it.”

It is always safe to talk about an imaginary being: you can give it any properties you need.

And the summit of it:

“... something profound also takes place ...”

One can derive anything from such a fundamental postulate!

#### **4. Level mixing**

This logical fault is brought about by employing the elements of different levels in the same argument. Thus, philosophy and science are different, and one cannot use philosophical considerations to prove the validity of a scientific model, and inversely, science is no argument in a philosophical discussion. Similarly, metaphors and other artistic tools are not directly applicable in science or philosophy, as well as a formal construction or an explicit ideological position would be inappropriate in a work of art.

Goswami can never distinguish physics from philosophy, presenting physical models as an expression of philosophical ideas, or philosophical schemes as scientific findings. Even within physics, there are different levels of description, and they get cobbled together in a sleight of hand. Those who aspire for synthesis may be thus swindled into impression of something integrative behind the scene – however, the very way this something is carefully avoided to discuss betrays the truth: there is no sense in the mix.

Identifying conscious beings with animals is one of the favorite tricks of many conceptual swindlers. As soon as one does not distinguish conscious life from life in general, there appears a wide range of possible ways of manipulation, according to the trivial logical scheme: if the Moon has ears, than the Earth has the form of a suitcase.

Also, it is ridiculous to explain anything in consciousness with the help of a trivial psychophysical experiment; a scientist would rather try to reveal the distinctions of human from animal psychophysics due to the interference of consciousness.

“Experiences lead to learning, one aspect of which is developmental changes in the brain-mind’s classical substructure – the memories and representations of experience.”

Mixing learning and memory is as unacceptable as mixing the brain with the mind. Implicitly, experience is here identified with mere conditioning, without any word about specifically human experiences.

Also, see above:

“How does an electrical impulse pass from one neuron to another...”

continued with

“Stapp (1993) also thinks that quantum processes play a key role in the release of neurotransmitters from vesicles into a synaptic junction. An action potential pulse opens channels for diffusion of calcium ions into the vesicular release sites.”

What has all that pseudo-physiology to do with consciousness?

A specific example of level mixing is confusing a reflection of a thing with the thing itself:

“Ordinary perception consists of the collapse of a possibility wave by consciousness (via recognition and choice) in the presence of awareness.”

Ordinary perception does not consist of any “collapses”. Rather, it may modeled that way in some weird “theories”. Identifications of that sort logically follow from the initially idealistic stand; one could scan Hegel’s works for the pattern.

Also: “Apparently, choice, and therefore quantum collapse...”

The latter clause could as well be deleted.

As a remnant of scientific thought discipline, one reads: “there should be no collapse of the wave, according to our quantum model.” Sarfatti is more accurate in that respect, always referring to a model; however, that does not prevent him from an implicit identification of the model with reality, which, however, requires a special demonstration, I would not waste time to present.

“Some of these alternatives propose to modify quantum mechanics in a major way (for example, nonlinear theories); others are not philosophically satisfactory (for example, decoherence theories);”

It is nonsense to say that some scientific model is “not philosophically satisfactory” – there are scientific criteria of consistency, and the practical value as the ultimate criterion. It is only philosophy that may need to be consistent with other philosophy. Later, we find:

“With a reinterpretation of Bohm’s work, his philosophy of implicate and explicate orders also needs to be modified.”

That is what Goswami really tries to do: talking philosophy. So, no physics can be referred to, but as an illustration by analogy.

“But there are two theories, one due to David Bohm (19), and the other called the many worlds theory (Everett, 1957),”

These are not theories, but rather primitive philosophical speculations illegally appealing to science for support.

All the above can be immediately applied to Sarfatti, who proudly declares:

“I am doing physics here not metaphysical flimflam.”

But consciousness study is hardly an appropriate place to do physics – one must do consciousness study instead. Mixing one science with another, it is Sarfatti who “is ill-posing the problem.”

### **5. Exaggeration**

Since no person can know everything, there is a good opportunity for a swindler: just say some nonsense in a manner hinting to some circumstances well known to the author – and the readers will have to suspect themselves of ignorance. This is one of the dirtiest tricks, playing on the essential psychological vulnerability of an honest person. The only way to resist it is to decide that no statement that does not have grounds in the text itself can be worth any consideration, and should be crossed out of it, the rest (if any) representing the “sediment” of the text’s true content. One must well trust the author to loosen that kind of filter.

For instance, the following sentence should have been filtered out:

“Quantum physicists have argued these matters of interpretation for decades without consensus.”

One who does not know much about quantum physics may believe that the author is well aware of the wide and colorful picture of the tedious effort of the scientists to comprehend what they really do... However, the only “physicists” this statement implicitly refers to is a narrow group of former scientists who left science to enter philosophical debates, on the same footing with any out-of-science interpreters. Quantum physicists just worked and did what they do to get many practical results. It is

philosophers who tried to use anything (including vulgarizations of quantum mechanics) to support their non-scientific (and even anti-scientific) views. Unfortunately, a number of well-known physicists took part in those philosophical discussions – having no proper philosophical background, and no inclination to get any, they readily became the captives of somebody else’s views, marionettes in the hands of those who did not care for science, but rather for the social and economic interests of certain social groups. However, as soon as one is engaged in a philosophical argument, one has to be a philosopher rather than scientist, and one’s words must be judged accordingly, without any reference to scientific merits of the person’s earlier work. In a mass, as my experience suggests, physicists are prejudiced against philosophy, since they could never understand it enough; from the other side of this philosophical ignorance, physicists often get tempted to talk philosophy, since they believe it to be simpler than physics, judging by what is called philosophy in the vulgar (“popular”) textbooks.

Note, that nearly the same sentence:

“Some quantum physicists argued these matters of interpretation for decades without consensus.”

would have a quite different air and not imply much behind the scene, hence leaving room for discussion.

Both Goswami and Sarfatti like presenting hypotheses as facts, very special models for general ideas. A typical disguise is presenting things as if their models have added something to earlier knowledge, except unnecessary complication, and trivial facts become put forth as brand-new discoveries.

“one thing is certain: consciousness is needed to make actuality out of the possibilities that the dual quantum system/classical measurement apparatus(es) present.”

This is not a “certain thing”, but an arbitrary statement.

“The quantum theory distinguishes between conscious and unconscious perception.”

This not a distinctive feature of any quantum theory. Most psychological theories treat the unconscious as different from the conscious one way or another. That Goswami’s discourse happens to mention it too is in no way an argument for, or indication of the theory’s validity.

“Unconscious processing is found to be of crucial importance in the creative process, for which a quantum explanation has been given (Goswami, 1999).”

The unconscious has been known for centuries to be of importance for creativity. No quantum theory was needed to indicate that.

The easiest way to become a champion is to compete with an imaginary rival. First, Goswami demonstrates that his arbitrary approach gets stuck in paradoxes, and then triumphantly declares that

“The paradoxes raised against this hypothesis have now all been satisfactorily solved (Bass, 1971; Blood, 1993; Goswami, 1989, 1993; Stapp, 1993)”

...with other as arbitrary constructs. No real achievement, but impressive!

## **6. Psychological pressure**

There are numerous methods of manipulating the reader’s psychological weaknesses to foist the feeling of authority on them. Just assume a pseudo-academic style, intersperse the text with numerous references, and especially self-references, use a dozen of incomprehensible terms – and it’s done: the reader becomes fascinated and knocked out of critical thought.

“One type of model of the quantum in the brain-mind posits a superfluid-like coherence in the movement of a constituent matrix (Stuart et al, 1978; Lockwood, 1989) arising from the interaction dynamics of the many-body system. The latest entry in this field is the work of Hameroff (1994) who sees this coherent build-up in the structure of microtubules within the brain cells (see also, Penrose, 1994).”

Sounds fantastic! Does it matter that it has nothing to do with consciousness as the main topic of the text, and there is very little sense in it at all? Don’t doubt, just feel the sacred awe in the face of the

Great Teacher! Skilled stress on the Teacher's superiority over the ordinary mortals (communicating through one of the adepts, mentioning his busy schedule etc.) is to complete the new religion.

While Goswami prefers implicit demonstration of superiority, Sarfatti readily comes to depreciating phrases like:

"He is obviously not a physicist and seems to have no understanding of the subject"

"an irrationally intellectually dishonest rant"

"Professional competence would help"

"Word salad"

However, if Sarfatti admits:

"All I see is excess verbal baggage",

how could he be expected to put forth any "perfectly rational sensible objections", as he pretends to? In fact Sarfatti's stand has nothing to do with rationality, being replete with illegal identifications, logical loops, level mixing, arbitrary assumptions etc. As a kind of disguise, Sarfatti tries to exercise psychological pressure pretending to know more than his readers:

"The only thing I have said about quantum tunneling is in the context of the recent Russian paper

<http://ufn.ioc.ac.ru/abstracts/abst98/abst9810.html#d>

In which zero point vacuum fluctuation triggers of individual quantum events (including quantum tunneling) appear to be modulated by advanced signals from the future"

But, when one reads the paper referenced, one can find nothing of the sort in it. This is a mere description of a specific patterns observed by a group of Russian scientists (biologists, not physicists) in measuring various statistical distributions. There is nothing about "quantum tunneling", or "signals from the future". The results described in that papers indicate the importance of accounting for the methods of discretization used in any measurement, and the temporal correlations revealed are most probably due to the procedures of clock synchronization adopted in Russia. Sarfatti's appellation to that paper is absolutely off the context.

"See also

<http://www.boundaryinstitute.org/articles/Radin-Esalen.htm>

for empirical evidence of reverse time flow in ordinary consciousness"

Once again, there is no empirical evidence of reverse time flow presented...

The examples of conglomeration of pseudo-terms like coherence, possibility, transcendence, or the "subject pole with the qualia of experience", can be found in Goswami's text in mass. I will rather concentrate on the habit of some writers to declare things that are far from being firmly established with an air of certainly and definiteness preventing any objections.

"It is well known that all attempts by psychologists and neurophysiologists to split the unity of a conscious experience (for example, by surgically splitting the brain hemispheres) have failed."

This is not well known, and even wrong. There has been no experimenting with consciousness as such, and it is only the integrity of perception that could be meant. However, numerous cases of split perception have been described both in scientific literature and in the arts – and many people could experience the feeling of internal dialog (or argument); moreover, what about doubts?

"One of the principal aspects of quantum functionalism is non-locality. Evidence for quantum non-locality of our experience abounds in the literature of paranormal phenomena (see, for example, Jahn, 1982)."

But there is no evidence of the existence of any paranormal phenomena. Currently, this is a matter of personal belief, not science. Even less one could tell anything about quantum non-locality (whatever it means) from any psychological experiment.



“Two subjects are instructed to meditate together for a period of twenty minutes in order to establish a *direct communication*”

Why should one believe in “direct communication”, telepathy and such? Meditation is a common psychological technique, but it has nothing to do with all that.

“One such unusual characteristic is faster-than-light propagation. In the phenomenon of quantum tunneling, the time taken by a quantum object while going through the tunnel can be measured, and such measurements are now revealing a compelling case of faster-than-light propagation (Chiao).”

One more example of a hypothetical phenomenon used to explain an arbitrary construct. Faster-than-light propagation is far from being a fact, since there is no evidence that could be commonly acknowledged.

One more typical trick is exploiting ordinary people’s vague ideas about what mathematics is for, and the common prejudice that once something has been mathematically derived, it must be certainly true. Combine it with a reference to some unknown “theorem” proved by an unknown person – and you can convince the reader in anything:

“cannot be used to transfer information, according to a theorem attributed to Philippe Eberhard.”

The reader is almost sure to know little about all that, and about the simple fact that physics never deals with information, which is the domain of a different science, communication theory. Any talk about “information transfer” may only be figurative in physics, despite the abundance of around-physics speculative literature trying to play on sheer term confusion (entropy in physics is a quite different kind of thing than entropy in communication theory).

One more technique of producing impression:

“Conventionally, Western philosophers”

This implies that the statement to follow is to convey some idea common to most Western philosophers. In fact, what follows does not characterize Western philosophy at all, at best being an opinion of a small group of philosophers, not necessarily Western.

“In accord with conservation principles that conventional science has established,”

What is meant under “conventional science” here? In science, conservation principles are never absolute, they only work under certain conditions. The very existence of a conservation principle means that there is a way to violate it.

A standard technique used by the street sharpers to draw their victims in the game is emulating fair play: a few rogues play among them and demonstrate how one can eventually gain a good sum; when a credulous fool believes them and enters the game, they swindle money out of him. Similarly, a few persons may emulate a scientific or philosophical discussion, referencing each other, challenging each other and demonstrating smart replies etc. This produces a kind of cultural context supporting their artificial constructs and impressing the newcomers; however, this cannot render such discussions more scientific or philosophical.

The simplest way to have a lot of evidence is to invent it. One can develop a pseudo-science around any imaginary thing: ufology, astrology, phrenology, demonology... For instance:

“Mental substance is subtle; it does not form gross conglomerates. In fact, as Descartes correctly intuited, mental substance is indivisible. For this substance, then, there is no reduction to smaller and smaller bits; there is no micro out of which the macro is made of.”

Fine. Invent a chimerical thing like “mental substance” and enumerate as many its properties as you like. There are many “theories” of that ilk, from Pythagorean numerology to modern “universal physics”, one example of which has once been presented at the KJF. Quite often such artificial constructions become an instrument of social oppression, like in the case of the medieval *Malleus Maleficarum*, or more recent *Mein Kampf*, or a number of popular socioeconomic theories. There is a couple of steps from identifying consciousness with the brain to “exact measurement” of who is

conscious enough and who is not, and social discrimination.

## 7. Gaps

Everybody understands that one cannot explicate any detail of a theory in an article of a very limited size. The authors have to omit certain details and apply for the reader's credit and respect. However, this objective circumstance opens wide horizons for swindlers, who can well present poorly connected ideas as if they were connected elsewhere, in a different discourse. In many cases, the reader will hardly ever check it – and those who try will only find more hints to an explication given elsewhere, and never the explication itself.

Logical gap is a trivial trick of that kind. Just connect two arbitrary statements with implication, and make the readers think that they are not smart enough to grasp the intricate logic of the discourse.

“If this quantum explanation of the Marcel experiment is correct, then the experiment also demonstrates the existence of coherent superpositions in the brain-mind.”

No explanation has been given indeed, and it is absolutely unclear, why the existence of psychological sets should imply any quantum effects in the brain?

“A thorough analysis (McCarthy and Goswami, 1993) shows that, indeed, if the two ambiguous words are shown simultaneously and with a pattern mask, then, due to quantum interference, the recognition times for the target word can be drastically different from what is predicted by connectionist models. Thus this experiment should be able to establish beyond any reasonable doubt the existence of quantum coherent superpositions in the brain-mind.”

Any “thorough analysis” based on arbitrary assumptions can only be compared with another as abstracted “theory”, as it happens here. Logic is out of this deal, and no relation to the psychophysical experiment described has been established, and even less to consciousness study.

“But then where does the purposiveness of mind come from? Logic dictates that only consciousness can inject purposiveness in the world.”

This is a very perverted kind of logic. One unknown thing is said to produce another, without any comment on how all that relates to the real world.

“In accord with conservation principles that conventional science has established, this subtle substance does not interact with the material substance in any direct way;”

Why? No argument for that, except the a priori assumption that it should be something mystical.

“As another application, a mental body which is conditioned by experience opens up the notion that some aspects of us may survive death. In other words, the doctrine that if the brain dies, the mind dies, can be challenged.”

Slogans. No term in this sentence has been properly defined, and no logic can be traced.

“cannot be used to transfer information, according to a theorem attributed to Philippe Eberhard.”

Even barring the inappropriate reference to information, one could only wonder in which way that “theorem” could be related to the matters discussed in the text.

“attribute properties of consciousness – experience and choice – to the mind.”

This sentence has no sense outside a context distinguishing consciousness and the mind, and at least some explanation why experience and choice should be considered as characteristic of consciousness.

“Since probabilities are multiplicative, if the probabilities are classical, then the total probability for choosing  $C$  for all subjects will be:  $5(P_1 + P_2)$ .”

The result is absolutely incomprehensible, since no model has been described that would allow calculating anything. Goswami is not interested in how subjects behave to produce the answers; he merely puts forth an arbitrary assumption and declares that

“Any deviation from this estimate will tell us about quantum interference and thus about the quantum

nature of the probabilities and, thereby, of choice (Woo, 1981).”

Nonsense. I will comment on the “quantum nature of the probabilities” in the next section, and identifying it with choice is utterly irrational.

“Additionally, I believe that something profound also takes place in the self-referential quantum/classical coupled system.”

When logic is dead, beliefs reign. Goswami *believes* that there is something he cannot comprehend, and, instead of doing science and/or philosophy, he falls into profanation of the both.

### **8. Bites**

Of course, no deception could make success without a mask of plausibility and promise. That is why the tricksters of all sorts mix their fabrications with a number of assertions and claims that would appeal to certain groups of the possible readers – like poison in a meal. Thus, Goswami plays on the integrative tendencies in the modern culture, when interdisciplinary research is praised high, and the rate of paradigm exchange between different sciences rapidly increases, as well as the attractiveness of the attempts to marry science with art, or science with philosophy; the latter is often a very unequal marriage, more like swallowing of scientific rationality by some mystical dogmas – and religion has always been eager to tame science, making it mere interpreter of the Scriptures.

Extensive appellations to physics in Goswami’s texts are intended to flatter those physicists who are not well enough educated to escape the professional snobbism, making them believe that physics can explain anything at all, and no other science (or philosophy) is needed.

To please different philosophical schools, Goswami introduced numerous declarations in the text: mystics are certain to be the selected nation; but objective idealists are strongly assured in Goswami’s sympathies too, and subjective idealists may enjoy his stress on that everything comes from consciousness; dualists should be content with the overall eclecticism of the approach and the “theory” of two substances; positivists may be happy playing with measurement and verification, and even materialists get their bone: “barring solipsism”!

The trivial idea that the brain (together with the rest of the human biological body) functions as a whole within a definite operational context is presented as an achievement of Goswami’s approach, to make happy modern system theorists, and the idea of self-reference, a vulgarized extract from Hegel, is to appeal to second-order cybernetics and similar conceptions.

To attract psychologists of various schools, Goswami mentions many psychological phenomena as if they were explainable in his line, without giving him any pain of proving that.

For a religious person and a Philistine, Goswami adds a bite in the form of possible immortality.

So, everybody can find something for themselves, and thus be induced to think: well, the rest of the text is sheer nonsense – but it still has a glimpse of reason in it, and hence can be tolerated.

### **NO SCIENCE**

A scientific study is to develop formal models for a specific range of phenomena, to indicate the directions of their practical usage. In particular, a scientific approach implies two indispensable components: purposefulness and modesty.

To be purposeful, a science is to concentrate efforts on its subject (that is, the range of phenomena to study – do not confuse with the conscious subject who does the study), and provide the results in that very field, rather than try to solve problems of some other science. As one of my physics teachers used to say, if you need an angle, calculate angle rather than mass. In the present context it would sound as: if you need to describe consciousness, speak of consciousness, and not anything else.

Modesty is the other side of purposefulness: treating a definite subject, a science must be always aware of the limited applicability of its models, so that determining the scope of the model’s applicability becomes an important part of any scientific research. Normally, the criteria of

applicability are obtained from a more general model, allowing for derivation of the model in question as a limiting case; quite often, the domains of different models get first empirically discriminated, which serves as a stimulus for developing a more general approach, which would have its own applicability limits. Different models may have intersecting domains, in which case the problems of applicability range becomes of crucial importance for the practical usage of the results of the science. There may also be boundary regions, where neither model works satisfactorily; this demands a special model for the boundary region, combining the elements of models on the both sides of the boundary – this latter models will be only applicable in the boundary region it has been intended to cover.

Consequently, if you meet a statement like “I am doing physics here” (Sarfatti), you can be sure that there is nothing about consciousness there, and omit the rest of the text, unless your are interested in physics rather than consciousness.

Similarly, if somebody tries to declare that a specific model is universally applicable and gives a comprehensive explanation of something, you can be sure that this has nothing to do with science, being a kind of poor philosophy.

Neither Goswami’s, nor Sarfatti’s approach satisfies the demands of purposefulness and modesty, and hence their writings cannot be called scientific in any respect, and the academic look they might assume is nothing but a disguise.

Putting aside the pertinence of Goswami’s approach to the study of consciousness, one might question the very presence of a model to discuss. Both Goswami and Sarfatti invite physics to support their position, and dismiss any objection on the grounds of insufficient “professional competence” of the opponents. But are they professionally competent in physics themselves? As I am going to demonstrate on Goswami’s example, the answer should be a definite “no”.

Let us look closer to what Goswami puts forth as physics.

### ***1. Quantum mechanics***

As it seems, Goswami’s knowledge of quantum mechanics (and probably other physics too) comes from poor popularizations and philosophical essays rather than the physical literature proper. He cannot see neither the specificity of quantum physics nor its propinquity to all the other branches of physics.

“The wave amplitude of an object in quantum mechanics (technically called a wave function or a coherent superposition) corresponds to a spread-out wave of possibility in potentia”

This sentence sounds absurd to a quantum physicist. First of all, three different concepts are mixed together: a quantum amplitude (“wave amplitude” is an instance of vulgar word usage) is a mathematical object representing a state of a quantum system – it is also called “state vector”, if considered as an element of the (extended) Hilbert space of all the possible states; the term “wave function” usually refers to a function defined on the configuration space of the system as one of the possible representations of its state vector; finally, coherent superposition is usually a way of transition from one set of basis vectors to another (regardless of a particular representation), and, in quantum physics, it plays a role similar to that of changing the frame of reference in classical mechanics.

Physics never deals with anything like “possibility in potentia”. In science, things are much simpler: every physical system is modeled with a formal (often mathematical) construction, and the properties of that model are related to observables through an interpretation scheme, which is virtually derived from a definite experimental set-up. Thus, the traditional quantum mechanics and quantum field theory is based on the scattering experiment, so that it is only the integral properties of the system that become observable; this leads to the common S-matrix (or K-matrix, R-matrix etc.) approach in calculating the “intensities” of quantum transitions, which may sometime be called probabilities in the physical slang, bringing in some term confusion much speculated upon in idealist philosophy. In the standard quantum approach, only the asymptotic behavior of a quantum system is physically meaningful. It is only recently that the possibility of studying the fine details of the transition has been

demonstrated, up to experimentally distinguishing coherent processes [Godunov *et al.*, *J. Phys. B* **33**, 971 (2000)].

There also exist coherent states that can be observed macroscopically: lasers, super-fluidity etc. However, they do not principally differ from any other physical phenomena, and it is in specific macroscopic conditions that such effects can be obtained.

“How does a laser get its special intensity in a narrow pencil beam, or a superfluid its special flow characteristic? The answer in each case is the phase coherent motion (as in dancing in step) of the constituents.”

Coherent motion is not a specifically quantum phenomenon. The quite classical motion of two bodies connected with a rigid join will be perfectly coherent, and one can readily provide hundreds of examples like that. Look at a mechanical chronometer to get a picture of perfect coherence in the motion of its different parts. For direct counterparts of quantum coherence, one could mention auto-resonance in mechanical systems, various feed-back schemes in electric circuits, solitons, acoustic fronts, and many other examples of the same type. Eventually, any motion at all is self-coherent to certain extent unless it is unstructured chaos, white noise. Quantum coherence is a special case of coherence in physics, and a stationary quantum state is an analogue of a standing wave, while non-stationary states may correspond to various kinds of dissipative wave packets.

“The quantum equation of the self-referential system of the brain-mind must continually be modified by the repeated measurement interactions.”

Goswami seems to be unaware of the self-consistent models in quantum theory. Ordinarily, there is no reason for changing the equations of motion for a many-body system with strong interaction from one instance of interaction to another. In a quantum process, everything that occurs between the initial and final states (asymptotic states determined by the experimental set-up) must obey the same dynamics, and the only possibility is redistribution of the relative strength of different interactions, as in reactions with charge transfer or post-collision interaction. Otherwise, the process splits into a cascade, with no interference and intensities summed rather than amplitudes, quite classically. The both limits are determined by the collision kinematics, the macroscopic preparation (as physicists say) of the microscopic event. One may need a different equation of motion only if the experimental scheme has changed between the two quantum events, which is certainly not the case in most experiments.

“Mark Mitchell and I (Mitchell and Goswami, 1992) have proposed that the modified equation is nonlinear (technically called a nonlinear Schrodinger equation) as opposed to the ordinary quantum equation (the Schrodinger equation) which is linear.”

There are hundreds of nonlinear models in quantum mechanics, of which fact Goswami seems to know nothing. Such models are difficult to use, and, in practical calculations, physicists often resort to various linearizations, thus obtaining special models applicable in a limited domain.

The Schrödinger equation cannot be said to be linear or not on itself – this depends on the interactions involved, and hence the form of the potential included in the Schrödinger equation. In the limit of independent particles, the interaction term is linear; as soon as dynamic coupling is to be taken into account, the very existence of a potential may become doubtful, and various approximations are used to preserve the formal resemblance to the Schrödinger equation: average potential (mean field), optical potential etc.

In the perturbation theory language, linearity is the lowest-order approximation, while already in the second order one has to consider numerous nonlinear effects. Using the standard (diagrammatic) interpretation of the perturbation scheme, we speak about virtual interactions (those occurring between the asymptotic states registered in the experiment): in a weakly coupled system, the particles interact just once during the reaction, and linear description is enough; however, many practically important cases imply two or more interfering interactions in the so called interaction region, and the theory must be nonlinear.

I could only mention the numerous nonlinear models in quantum field theory, starting from the

famous Young-Mills theory, up to the tentative schemes of quantum gravity.

However, nonlinear equations are not the only way to introduce nonlinearity. Even with a linear equation of motion, one can get nonlinear dynamics if the boundary conditions are nonlinear (which is often referred to as spontaneous symmetry violation). There are classical analogues: linear systems with nonlinear constraints. In quantum mechanics, there is a source of inherent nonlinearity, normalization: the demand that the microscopic process should be consistent with macroscopic environment (certain types of incoming and outgoing particles, momentum/energy conservation, or other constraints) is formally reflected in the normalization scheme applied, which can be linear only in an isolated quantum system interacting with no other bodies, which is a very strong approximation that can only be considered as an ideal case, an abstract model that should be applied with caution to real systems. It is only theorists like Goswami who can identify such abstract models with reality.

“Non-linearity means that the current value of the possibility wave function depends in a complicated way on its value at a previous time.”

This is wrong. There may be different kinds of nonlinearity in a stationary system, without considering any time dependence at all, and there may be rather complex time dependence in a linear system, under certain kinematic conditions.

“The truth is, except for quantum measurement, matter is law-like – cause driven. The time development of matter is entirely given by the laws of quantum mechanics.”

This is sheer nonsense! Time-dependent models can be found everywhere in physics, and it is in quantum mechanics that temporal dynamics is the most commonly ignored, leaving the room only for virtual sequencing, in-between the observable asymptotic states. Laws of quantum mechanics reflect a very limited area of the possible phenomena, and modeling time dependence has never been a strong side of quantum theory.

“Is the play of probabilities in the brain-mind classical, or quantum?”

For the time being, let us ignore the circumstance that there is no such thing as brain-mind. However, the very talk of quantum or classical probabilities is absurd: there are no classical or quantum probabilities, since, for interpreting a quantity as probability, it does not matter how that quantity has been calculated.

“There is a distinct mathematical difference between classical and quantum probabilities.”

Sheer nonsense. Mathematically, to be interpretable as probability, a measure must satisfy a number of axioms that do not involve any reference to physics at all, quantum or not (e.g. ref. [G.J.Klir & T.A.Folger, *Fuzzy Sets, Uncertainty and Information* (Englewood Cliffs, NJ: Prentice Hall, 1988)]).

“In quantum mechanics, the probability amplitudes are added algebraically before squaring to find the net probability, for example, of the result of the passage of electrons through a double-slit arrangement. In classical physics, on the other hand, the probabilities simply add.”

The vulgar usage of the term “probability” in this context can only be justified by the historical reasons, ascending to the dawn of quantum mechanics, when the physicists did not yet well know how it could be used. One should never identify this physical “probability” with what is called probability in mathematics, and even less with the common language meaning of the word. Physical terms may sound like the words of the ordinary language, but they mean different things as physical terms. Thus, it would be ridiculous to picture a colored quark and try to smell its flavor. Similarly, the terms like probability, entropy, energy etc. have a special meaning in physics that may be different from the meaning of the same words elsewhere.

It would be more appropriate to speak about intensities rather than probabilities in physics, to refer to what is actually measured. There is no such thing as a “probability amplitude” (a school textbook term), there are quantum amplitudes (better: pure states, vectors) that can be used to calculate intensities (rates) for various processes.

Here, Goswami only describes the methods of calculating “probabilities”, or rather the numbers of

particles, in a quantum or classical theory. The intensities themselves are always macroscopic (which, by the way, makes the very comparison possible).

Moreover, amplitude summation is in no way a monopoly of quantum mechanics: there may well be correlated classical processes quite analogous to interfering processes in quantum mechanics. The latter has borrowed the slang of the classical wave theory from optics, acoustics, hydrodynamics, etc. For another example, a system of few coupled oscillators may have natural modes analogous to pure quantum states, as well as chaotic regimes, which can be described in a “classical” way. When a fast enough classical harmonic oscillator interacts with a remote body, oscillation phase becomes irrelevant for the interaction in most cases except a few “resonance” points – this is exactly what happens in quantum mechanics.

“It is the addition of amplitudes before squaring them that gives the phenomenon of quantum interference.”

Exactly like any wave amplitudes add to produce wave interference, no matter quantum or not.

“In other words, they are wave of possibility given by the quantum wave function.”

This is an anti-physical interpretation that leads to further inconsistencies. Trying to juggle “possibilities” into physics is nothing but philosophical idealism, inability to distinguish the scientist from what he studies.

“The quantum state of the subjects’ brains would then become a coherent superposition in response to the ambiguous signal, fifty percent for recognizing *A* and fifty percent for *B* [...] Suppose the probability of choosing *C* after having chosen *A* is  $P_1$  and after having chosen *B* is  $P_2$  ( $P_1$  and  $P_2$  can be measured by repeated experiments with several subjects).”

One cannot speak about probabilities if a quantum model is meant; one must sum amplitudes and introduce a transition operator that would produce intensities (“probabilities”) from the amplitudes. The way Goswami handles probabilities shows his absolute ignorance in quantum mechanics.

“In the case of the double-slit experiment, for example, Bohm’s particle equation can show us curved trajectories of how a particle may be able to go through one slit and still arrive at classically forbidden places on a fluorescent plate.”

It is funny, how petty philosophers of all kinds seriously refer to the “double-slit experiment” that has been invented as sheer abstraction, a means of visualizing a particular calculation technique. This confusing illustration appeals to the macroscopic notions one may have, as if they were applicable in a quantum process, which is certainly not the case. One might as well think that the diagrams of quantum electrodynamics could picture the motion of the particles involved!

Quite naturally, when one tries to treat a very incomplete analogy as an exact description, inconsistencies are bound to abound. The “double-slit” set-up is far from the scheme of quantum experiment, and it cannot be used to deduce anything about nature and its laws.

“How does the particle know that the other slit is open and veer itself to the quantum mechanically allowed places?”

The question is incorrectly formulated. In quantum physics, there are no particles, waves, or any other macroscopic formations. It is only for a macroscopic observer that quantum systems may seem to manifest certain particle-like or wave-like behavior. Unfortunately, up to now, there are people who cannot admit that there is something in the world that does not fit into their macroscopic views and Philistine notions, that something can be unattainable to the five human senses and still remain real and observable, with indirect methods.

“but when we observe, we see the object localized like a particle.”

This is not true. In a quantum experiment, we do not usually observe waves or particles – we just measure spectra of various kinds (integral, differential, angle-resolved etc.); the analysis of these spectra within a certain physical model may allow a physicist to assimilate the system either to a collection of particles, or a superposition of waves, depending on a number of formal similarities –

such an assimilation can never be anything but analogy, it does not possess any methodological significance, and physics can well do without it, save the fact that physicists live in a macroscopic world and macroscopic analogies for microscopic events can help to “visualize” an abstract model and thus make one’s intuition work.

Quantum objects are neither particles nor waves. They are quantum objects obeying specific, but well definable laws.

“So the mental world is a whole, or what physicists sometimes call an infinite medium.”

Physicists do not need weird terms like that. They may model one medium or another, but they are always aware that physical “infinity” is different from mathematical “infinity”, and “much greater” (by an order of magnitude) is often enough in physics to discriminate between different levels of description.

“Although the macrobodies of our environment are made of the micro quantum objects that obey the uncertainty principle, because of their grossness”

There is no such physical term: “grossness”. Rather the word should be applied to the way Goswami treats physics: cruelty, brutality, savageness (if you have MS Word, press Shift-F7 with the cursor on the word).

“Bohm’s waves are not physical waves. Instead, they satisfy the Schrödinger equation.”

One might think that the waves satisfying the Schrödinger equation are not physical! However, physics by definition works only with what is physical, regardless of whether it is observable or not. A mathematician may ponder over the completeness of the set of the possible solutions of an equation – a physicist, in most cases, will quickly dismiss some solutions as unphysical, and proceed with the physical ones.

“cannot be used to transfer information, according to a theorem attributed to Philippe Eberhard.”

“Through the nonlocal influence of the quantum potential, which acts as a source of ‘active information’.”

Physics does not deal with information, and it is only through term confusion and illegal identifications that it can be introduced. An analysis of the numerous attempts of that sort should be given elsewhere. I would only point at the weird terminology like “nonlocal influence of the quantum potential” or “active information” that does not bear much science in it.

“demonstrating the radicalness of quantum physics”

No sense. Science cannot be radical or not, and one model is worth another. Quantum physics is applicable in one case, classical mechanics in another; thermodynamics helps to solve yet another problem. Preferences are beyond science.

## **2. Quantum and other objects**

When a person arrives in a country inhabited by a different race, all the people may seem much like one another, and it must take time and good will, to learn to distinguish faces. Similarly, Goswami’s poor knowledge of physics (and other science) gives way to the lack of discrimination as the specificity of the subjects of different sciences, and the objects described by different models within one science. The only way to overcome this blindness is learning, and one must want to learn for that. Otherwise, one’s position will be like that of a racist, who claims all the “niggers” (or “Jews”, or “Russians”...) to be the same; it does not matter whether that uniform mass will be despised or deified.

“All objects are quantum objects.”

This is entirely wrong. Only the objects involved in a quantum process are quantum objects. There are all sorts of other objects, at different levels of the hierarchy of the forms of motion. The same thing can be a different object in different activities, in different respects. Denying that means the death of



science.

“Note that I am not introducing a classical/quantum dichotomy. Ultimately, all objects are quantum objects; therefore, a classical measurement apparatus can never really *measure* a quantum object.”

Being unable to see the difference between classical and quantum motion, and hence their close kinship and relatedness to each other, Goswami perceives any distinction at all as rigid “dichotomy”. Yes, it would not be wise to oppose one science to another; but it would be even less wise to reduce all sciences to one. Not all objects are quantum objects, and the only measurement we can do is with macroscopic devices – however, these macroscopic objects involve microscopic processes as their part, and we can observe their macroscopic traces, that is, perform indirect measurement.

Quantum object = object involved in a quantum process. Quantum experiment is designed to initiate certain quantum processes. Industrial devices assist in another class of activities that may be similar to quantum experiment in some respects.

“This question, I think, can be answered with an even more decisive and objective experiment that can discern between classical and quantum models of the mind.”

Experiment does not discern between different models. Rather, attempts to apply different models for interpreting experimental results reveal their relative applicability to the particular type of experiment. Some models better describe one class of experiments, other models work better for a different class of experiments involving the same object.

Physical experiment is a special case of activity that may involve various objects in an either classical or quantum way, or rather a combination of the both. The organization of the experiment determines the types of models applicable to it, and sometime a theoretical model may suggest the organization of experiment required to reveal the effects predicted.

“Now in order to determine the trajectory of an object, we need to know where an object is now but also where it will be a little later; in other words, both position and velocity, simultaneously.”

In physics, trajectory does not need to lie in a usual 3-dimensional space; rather this is trajectory in some phase space (or a manifold) that may be very unlike the Euclidean 3-dimensional space the popular literature gets stuck in. This is so already in the usual classical mechanics [V. I. Arnold, *Mathematical Methods of Classical Mechanics* (Moscow: Nauka, 1979); V. V. Dobrolyubov, *Foundations of Analytical mechanics* (Moscow: Vysshaya Shkola, 1976)], and especially in statistical physics and quantum mechanics. Goswami identifies any object at all with a (macroscopic) particle, which is wrong, since there may be other kinds of objects following trajectories of a different kind.

Already in classical physics, there are objects other than particles: waves, fields, continuous media etc. What would Goswami call a trajectory of a gas?

“Thus macro bodies can be approximately attributed both position and momentum and therefore, trajectories.”

Quantum systems also have trajectories, in their configuration space, infinite-dimensional. Those trajectories may be not observable – but they are a physical as any other kinds of trajectories, as long as they may be used to obtain any observable values.

“So we can never determine accurate trajectories of quantum objects.”

There is no need to determine them. The fundamental principle of quantum physics is irrelevance of an individual path of reaction to the observable characteristics, which are always averaged over all possible trajectories (in the general sense indicated above: in the space of the system’s states). The very question about the trajectory of an electron in atoms is absurd, unless we move to a theory different from quantum mechanics.

On the other hand, the accurate trajectories of classical objects too are nothing but theoretical abstraction. There are no point particles in physics, and one has always to omit certain modes of motion as irrelevant to the problem considered. It is in classical mechanics that such popular techniques as perturbation theory or WKB method have been born.

“Although the macrobodies of our environment are made of the micro quantum objects that obey the uncertainty principle, because of their grossness, the cloud of ignorance that the uncertainty principle imposes on their motion is very small, so small that it can be ignored in most situations – this is called the correspondence principle.”

This is a most vulgar formulation of the correspondence principle. The latter is a fundamental paradigm of the modern science asserting a quite simple thing: if two theories have intersecting areas of applicability, they must lead to the same results in the boundary region, and there must be a correspondence between their basic quantities. The correspondence principle does not say anything about regions where only one description is applicable – various manipulators prefer to forget about that and present inadmissible extrapolations as new “radical” conceptions. This is the true “cloud of ignorance”, advocated by poor philosophers.

“What prevents ordinary macro-objects from displaying significant quantum uncertainties of movement is their mass.”

This is an entirely wrong statement. First of all, there are no “uncertainties” in quantum physics. All its laws are quite deterministic, and calling, say, spectral line broadening a manifestation of some intrinsic uncertainty is an instance of vulgar word usage. In the same way, one could imagine people smelling quarks, since they possess flavor – disregarding the fact that quantum flavor has nothing to do with the olfactory cortex, merely being a conventional term.

Second, this is not mass that prevents macroscopic objects from quantum behavior. First lasers were quite massive, weighing up to several tons – still, their functioning was as quantum as that of tiny modern lasers approaching big molecules in size (though still having macroscopic rather than atomic dimensions). The neutron star is a quantum object on the astronomical scale, with a mass comparable to that of the Sun. The ability of a system to exhibit quantum behavior is determined by its connection to the rest of the world, the way it interacts with it. Thus, one might try to use a laser to crack nuts, which would make it an entirely classical object. Even elementary particles behave quite classically in track detectors, where their positions and momenta get simultaneously determined without too many quantum restrictions. Those who worked in quantum physics know well that it is the momentum (energy) transfer per mass unit that can be related to the quantum/classical type of behavior. That is, two systems that interact in a way assuming their momentum/energy exchange comparable with their effective mass (or similar threshold parameter, e.g. binding energy) will have to be described with the formalism of quantum physics, regardless of their size, mass etc. Try to measure the position and momentum of a billiard ball scattering other balls on it – you will get a typically quantum picture with otherwise classical bodies.

“But the calcium ions are of small enough mass, and thus their diffusion has a quantum nature.”

From the viewpoint of atomic physics, calcium atoms are infinitely heavy (meaning the physical rather than mathematical infinity), and they are purely classical in diffusion.

“Whereas for *classical* diffusion there is only one possible path of flow (for all practical purposes) for the ions, in quantum diffusion the ions simultaneously flow in many possible paths, creating a substantial ambiguity.”

Nonsense! Classical diffusion is a typical example of a statistical process, which cannot be traced up to the paths of individual molecules. The term “quantum diffusion” invented by Goswami (or borrowed from other philosophers like him) is alien to physics; one could try to associate it with penetration through a potential barrier – in this case, it can hardly be molecules or ions that are concerned, since ions behave quite classically already in chemical reactions, and it is their electron shells only that demand quantum description. Even for a hydrogen ion (proton), its De Broglie wave is too small to be comparable with the width of the membrane of a brain cell. Also, “flowing in many different paths”, or “ambiguity”, has nothing to do with quantum physics, where the evolution of the states is entirely deterministic.

“Many such quantum interactions occur in possibility at many synaptic sites. This gives the brain, upon amplification by other neural processes, a macroscopic possibility structure until one component

in that coherent superposition of possibilities corresponds to a state of macroscopic cognitive meaning that consciousness recognizes.”

The existence of random processes at many synaptic sites does not imply that the macroscopic behavior will be stochastic. Thus the stochastic drift of electrons in a metal results in a quite deterministic current obeying the Ohm’s law, and all the stochasticity of molecular motion in a rarefied gas is well enough reduced to the ideal gas equation, which, together with a couple of other as deterministic equations determines the dynamics of the gas volume (for instance in a pump, or a press).

Inversely, the behavior of the elements of a big system may be highly deterministic – but their collective motion may exhibit quantum-like peculiarities. Whether such collective modes exist in the brain is an open question, but this not physics that is concerned.

“Bohm’s basic idea is to represent the situation of quantum mechanics with a wave piloting a particle, an idea he took from de Broglie (19).”

Primitive metaphors of early science. There are neither particles nor waves in quantum physics (at least as dynamic entities). All we deal with is quantum states that obey certain dynamic laws. It is a vulgarization to think that, in a quantum system, the particle-like and wave-like properties are simply mixed in an eclectic way – a quantum system is qualitatively different from both classical particles and classical waves.

### **3. Measurement**

When quantum mechanics just began its history, it was natural for physicists to wonder whether the study of a quantum system is different from that of any other physical system. Today, when the scientists have accumulated enough experience to make their intuition work with specifically quantum objects, they do not need to compare quantum experiment with other kinds of experiment. Quantum physics did not suggest any specific methodology in experimental physics, and the principles of staging and basic experimental techniques have remained the same. This is quite natural, since experimentalists can only register macroscopic events, no matter which kinds of processes underlie them; the only specificity quantum experiment may have introduced is using an advanced quantum theory to explain experimental results, so that their relation to the properties of a microscopic system involved becomes rather indirect.

However, the situation is not as novel as it may seem. For centuries people observed the motion of the stars and planets across the sky trying to organize these “direct” measurements, and it required the Copernican revolution to realize that the observable behavior of celestial bodies should be treated as a manifestation of something we cannot observe directly and have to theoretically model prior to interpreting. For a more recent example, one could mention the notion of a field in classical electrodynamics, with all Faraday’s efforts to visualize fields to make them more acceptable to scientists, and Maxwell’s mechanical model of electromagnetism designed to convince those who could not yet think in the novel way suggested by his field equations; one could also discover the still living descendants of Maxwell’s demon in modern thermodynamics.

Quantum physics is comparable with the Copernican revolution in that it removed one more anthropocentric prejudice and made physicists acknowledge the existence of a vast area of phenomena unlike anything known before. As usual with indirect measurements, the problem of authenticity of theoretical models used is of primary importance in quantum experiment. However, this is a matter of physical study rather than philosophical discussions. Thus, the existence of autoionizing states in atoms and ions as real rather than virtual objects can be confirmed only by developing methods of extracting the quantities characterizing such states (e.g. excitation cross sections) from experimental data (spectra of electron, proton and ion scattering on atomic targets) [see Godunov et al. (2000), referenced above].

Philosophical idealism is much like anthropocentric models in physics: it cannot comprehend the idea that what we see is mere reflection of what happens, and one has to think a little bit to understand one’s own observations. To get rid of idealism in consciousness studies, it is not enough to

demonstrate its weakness and inconsistency – we have to develop a better approach and make efforts to establish it as a practically useful standard.

Goswami's "theory" of measurement is based on an anthropocentric view of an ordinary man-in-the-street, since he is not well acquainted with the theoretical and experimental methods used in science. Trying to inadequately generalize such a view leads to various artificial "problems", and the attempts to resolve them with arbitrarily introduced notions can only result in more "paradoxes".

"We need the intermediary of the macrobodies, a *macro-measurement* apparatus, to amplify the micro quantum objects before we can observe them."

This is the core of Goswami's misconception. The only way he can imagine microscopic objects is that of the same big things, but in miniature. A primitive metaphor of a microscope, just amplifying very small objects to make them visible, without significantly interfering with them. Goswami cannot imagine an experiment that would significantly change the state of both the system observed and the observer, he cannot switch to another paradigm, that of participation rather than contemplation.

"Therefore, any machine, such as the ones called *measurement apparatuses* that we use to amplify a quantum phenomenon, itself becomes a possibility wave (a superposition of macroscopically distinguishable possibilities) when in contact with micro-quantum possibilities."

Measurement devices do not "amplify" a quantum phenomenon – they are used to make measurements, that is, produce macroscopic events that may bear the traces of microscopic processes that are not directly observable. The results of any measurement certainly have to be somehow explained and practically applied. The relation of a measurement result to a quantum process may be very indirect, and basically the same measurement schemes can be re-interpreted to get a deeper insight into what is going on in a microscopic system.

"Consciousness can collapse the whole conglomerate because it transcends the material universe."

The fact that human observers are a part of the measurement scheme does not mean that human consciousness has anything to do with the processes studied. One can account for any macroscopic influence in a microscopic model, using its intrinsic parameters in a purely scientific way, without any mystics.

In some cases, a measuring device can be described with a state vector (or, rather, a density matrix). This is a usual approach of the traditional theory of quantum measurement [e.g. A. J. Ferguson, *Angular Correlation Methods in Gamma-Ray Spectroscopy* (Amsterdam: North Holland, 1965)]. More complicated cases can be covered by a more advanced theory [e.g. M. B. Mensky, *The Path Group: Measurements, Fields, Particles* (Moscow: Nauka, 1983)]. However, there is no need to talk about any "possibilities", or "possibility waves", which are outside physics; the distinction of "macroscopic and "micro-quantum" possibilities is an example of sheer demonology.

"The state of the quantum machinery expands as a coherent superposition, and all the classical measurement apparatuses that couple with it also become coherent superpositions."

This is not true. Usually, the state of the quantum system + measurement device is a mixed state described with a density matrix, rather than a "coherent superposition". The form of the density matrix is closely related to the (macroscopic) scheme of experiment: thus, one would use different expressions for the density matrix of photons, depending on whether the experimentalist will use linearly polarized, circularly polarized, or non-polarized light source, or detect outgoing photons with or without a polarimeter. Yet another density matrix is to be used when the photon emission is registered together with electron emission, or in parallel with detecting scattered protons.

"A quantum measurement corresponds to a discontinuous and non-local collapse of a wave-like state (many possibilities) into a localized particle-like state (one actuality)."

This is one more example of terminology incompatible with physics. Quantum physics deals with the dynamics of quantum states and their asymptotic properties at physical infinity, corresponding to the observable macroscopic picture. There is no need in the notions like "non-local collapse", invented by poor philosophers to disguise their insufficient acquaintance with quantum mechanics and inability to

comprehend anything that is not like the ordinary things they see around them. To repeat: physicists only calculate various parameters of their formal models and relate them to experimental procedures or industrial processes using special interpretation schemes, which have been designed to reflect the world as it manifests itself in certain human activities. If you do not produce a practically applicable (at least to certain extent) result, you cannot pretend to be a scientist. An entirely artificial idea of “quantum collapse” does not have any relation to physical study, only producing a lot of idle talk of a vulgar-philosophical smell.

“Who/what chooses which possibility is manifested in a particular measurement? If choice is involved, is consciousness?”

Once you have invented an artificial problem, you get stuck in it forever... Physical (as well as any other) measurement never deals with any possibilities and choice – all it does is to produce a value that can be related to the values calculated in a number of theoretical models, or it can be stored in a bank of atomic data and used as it is, in physical or industrial applications. The value obtained in a physical experiment (no matter quantum or not) can only have sense within a definite physical model, and there may be different models for the same phenomenon describing its different aspects. There are no possibilities or probabilities in quantum theory – instead, it works with intensities, cross sections, rates etc. It is absolutely contrary to the very idea of science, to assert that some mystical creature interferes with atomic reactions and determines the value of the differential cross section.

“The quantum equation of the self-referential system of the brain-mind must continually be modified by the repeated measurement interactions.”

In a quantum theory of measurement, one should use the same evolution equation for the whole system until it would reach its asymptotic state; two separate measurements (interactions between the system and the observer) can be described with different equations only if the measurement scheme has changed.

“It itself is described by possibility waves and thus cannot resolve another object’s possibility wave into actuality.”

There are no “possibility waves”, and no need to “resolve” anything. There are macroscopically determined boundary conditions, determining the asymptotics of the wavefunctions. This is how quantum processes get linked to macroscopic observables. Mathematically this often means averaging over individual paths of reaction.

Conceptually, quantum mechanics is quite like classical mechanics: one cannot solve the equation of motion for a classical system without boundary conditions; similarly, one cannot solve the Schrödinger equation without specifying particular asymptotics, which will be different for different types of reactions.

“However, because of its large mass, we can simultaneously assign both position and momentum to it, albeit approximately; this is Bohr’s correspondence principle. This property allows us to use a classical measurement apparatus to amplify the quantum possibilities for us to *see* and to make a memory of what we see.”

We do not see quantum events, albeit “amplified”. We observe their macroscopic effects. A skilful scientist can relate the macroscopically observed picture to certain microscopic processes, as described by a specific theoretical model. Such a relation cannot be but approximate, and a disagreement between the model and experiment may mean either the model inadequacy for that type of experiments, or insufficient accuracy of experiment, or incorrect processing experimental data while extracting the values to compare, or any other reason. No specifically quantum uncertainties are ever considered.

“everybody can simultaneously see the macrobodies.”

It is only macroscopic bodies that we see. But this does not hinder observation of microscopic objects, through the fine details of macroscopic motion.

“Any deviation from this estimate will tell us about quantum interference and thus about the quantum

nature of the probabilities and, thereby, of choice (Woo, 1981).”

It might as well speak of the wrong assumptions in calculating the probabilities.

“There is a difference between an ordinary quantum measurement, such as the measurement of an electron by a Geiger counter, and the quantum measurements that take place in the brain.”

Geiger counter is a classical device measuring the classical events of a charged particle passing through the volume of the counter and interacting with electromagnetic fields in a classical way. There are no quantum measurements in the brain as well.

“one thing is certain: consciousness is needed to make actuality out of the possibilities that the dual quantum system/classical measurement apparatus(es) present.”

Quantum measurement does not differ from any other measurement, and it does not deal with possibilities and actualities – so the necessity of consciousness interfering in it is not certain, and even false. This is pseudo-philosophy pretending to be a theory of measurement.

“The classical equation in Bohm’s theory is not, strictly speaking, a space-time equation because the quantum potential depends on the wave function which has no space-time existence until it is collapsed. [...] without knowing where the particle ends up, Bohm’s method cannot be applied to calculate the particle trajectory.”

There are no “collapses” in quantum physics, and the existence of a quantum state does not imply the necessity of its correspondence to any particles or waves. Quantum mechanics calculates what is appropriate to it without any “collapses”. If there is no means of determining the trajectory of a particle, that trajectory is irrelevant to the outcome of the reaction.

“Through sheer sophistry, Bohm and his collaborators avoid dealing with the fundamental problem of quantum measurement: why only one of the possibilities become actual in a measurement while all others do not.”

Sheer sophistry is to speak about any possibilities in quantum mechanics, and any problems here are due to ignorance and lack of conscience.

“Like Stapp, we believe that the measurement problem is not solved by Bohm’s interpretation of his mathematics,”

There is no problem to solve. No wonder physicists do not care much for such fictions, and merely proceed with scientific study, without collapse.

#### **4. More quotations**

In this subsection, I list a few more example of the frivolous manner Goswami has to treat science mixed with anything else. Also, I would like to stress that there is nothing novel in any Goswami’s conclusions that still can be translated into the language of science.

“We find that, as a result of the feedback from this non-linearity, the quantum possibility waves of a self-referential system gradually become conditioned; the probability of actualizing formerly experienced states gradually gains greater weights. (Similar conditioning has been theorized for photons in a resonant cavity, also, due to the non-linearity of their Schrodinger equation; Carmichael, 1993.)”

Well, one more nonlinear model that has yet to be interpreted. Why should it be applicable to consciousness? In a scientific approach, one would try to compare the properties of the solutions obtained with the empirical evidence, rather than seek for a mystical background.

Such terms as “possibility waves”, “actualizing”, “experience”, “conditioning” do not belong to physics. A scientist would try to outline the range of phenomena modeled, rather than pretend to do physics where there is no trace (and no need) of it.

“This is the effect we see here. In essence, learning increases the likelihood that, after the completion of measurement, the quantum-mechanical states of the tangled-hierarchical quantum-

system/measurement-apparatus will correspond to a prior learned state.”

In a normal quantum language that could be reformulated as increasing the populations of certain states in a specially designed nonlinear system. Why, this is a normal behavior of many quantum and classical systems. For instance, the ground state of an atom is more populated than excited states in a gas under normal conditions. Also, in an ensemble of damped harmonic oscillators (e.g. balls in a pit), the less energetic modes will be more populated.

“When the creative potency of the quantum system is not engaged, when the primary awareness events are not attended, the secondary-awareness processes of memory-replay dominate; the tangled hierarchy of the systems of the brain-mind, in effect, becomes a simple hierarchy of the learned programs – the representations of past experiences.”

One can only shiver at such terms as “creative potency” being applied to quantum systems... In the normal language, the model is designed so that it becomes linear asymptotically, with time tending to infinity. Why not? Most quantum systems are linear at spatial infinity, many scattering problems assume that there are no post-collision effects.

“But in truth, the solution to the measurement paradox already exists – namely, to assert, as the mathematician John von Neumann (1955) originally did, that it is consciousness that collapses the quantum possibility wave. It is consciousness that chooses which possibility will manifest in actuality.”

Since there is no paradox, there is no need to solve it. It is a trivial fact that people get anything as a result of their activity – that is, an experimentalist stages his experiment in a way intended to lead to the result of a definite kind. This is the only chance for consciousness to influence experimental results. However, this does mean that people’s actions can ever produce anything that would contradict the objective laws of motion, characterizing material interactions involved. A physicist that would try to impose his will on a quantum system by merely thinking of it should be justly treated as mentally insane. There are other ways to make things behave following conscious will: just invent an apparatus implementing certain objective logic.

“There is, however, one question that continues to be raised: Is consciousness absolutely necessary for interpreting quantum mechanics?”

Consciousness is necessary for any interpreting at all, since it is a conscious being who does the interpreting. However, there is no place for consciousness in physics, and in quantum mechanics in particular.

“If two people simultaneously make an observation, whose choice counts?”

Yet another imaginary paradox. The result of an experiment does not depend on any individual consciousness – rather the collective consciousness of the humanity is embodied in the experimental set-up reproducing certain aspects of the productive activity of humans; it is this material apparatus that interacts with the quantum system, and never any transcendental substances.

“In his philosophical writings, Bohm also leaves us with the impression that reality comes to us via two orders, one implicate or implicit or hidden that guides the behavior of what is explicate or explicit, the order that we see, the order that is causal and objective.”

This is important: Bohm is no philosopher, and his philosophical writings cannot be judged by what he has done in physics. Goswami plays hypocrite, trying to present Bohm’s philosophical musings as physics.

“The implicate order is easily seen as the transcendent order of quantum potential where ontologically, the quantum wave functions or possibility waves reside.”

A climax of absurdity. No word in this sentence has any relation to physics, or any other science.

“In the human dimension, the idealist interpretation is being used to construct a new science within consciousness that can treat not only the material world, but also our internal mental world, for example, a theory of creativity (Goswami, 1998).”

There can be no idealist science: any form of idealism implies denial of any cognition at all, since idealism admits the existence of entities that cannot be comprehended. The explanations idealism may give all reduce to one: this comes out of consciousness (idea, god, ...) as an ultimate source of anything, and we cannot know what “consciousness” is.

There can be no science trapped within consciousness, and no consciousness where science is trapped.

## NO PHILOSOPHY

Finding no science in Goswami’s writings, one might fancy that some original philosophy could be detected there. However, at a closer investigation, one finds no philosophy, and no originality. Throughout his article, Goswami insists that he has invented a new “ontology” of consciousness:

“I (Goswami, 1989, 1990, 1993) have shown that if one understands consciousness as the ground of being (I call this ontology monistic idealism), then all objections find simple satisfying answers, as we will see below.”

From this declaration, one might expect to discover a sort of idealism marked with a strong integrative tendency. However, the history of philosophy already knows such attempts, and the available choices are minimal: either subjective idealism, which claims individual consciousness be the origin of all things, or objective idealism, inventing an abstraction of consciousness developing on its own, with individual consciousness being a partial manifestation of it.

Consistent (monistic) subjective idealism is known as solipsism, the idea that nothing exists at all except the advocator of this idea; there is no use to talk to such a person, since he/she cannot adequately perceive the world and other people, which is a medical case. Goswami seems to feel that and deliberately dissociates himself from subjective idealism: “...barring solipsism...”

As for objective idealism, we know about one comprehensive monistic system following this approach, that of Hegel. That was the summit of philosophical idealism, and nobody could develop anything as fundamental afterwards. Hegel’s great attempt has explicitly shown that consistent objective idealism transforms into its opposite: dialectical materialism, Marxism was born as a logical conclusion of Hegel’s system.

The only possibility to develop idealism after Hegel was to deny any consistency at all, and philosophical monism in particular. This logically led to eclecticism and dualism of all the philosophies after Hegel and Marx. Goswami could only provide yet another example. Though the very desire to adhere to the main principle of any philosophy, namely, the unity of the world, is remarkable, reflecting an objective tendency existing in the human culture of today, Goswami fails to suggest anything that would deserve the name of philosophy. His writing eclectically mix ideas that are incompatible with each other, contradicting his pretence to create a new philosophy of consciousness.

### *1. Wrong questions*

Insufficient philosophical education often prevents people from clear realization of what philosophy is for and how it differs from other cultural phenomena. A popular novelist may be said to develop some philosophical ideas, or study human psychology etc.; such statements should be considered as metaphors. Many eminent philosophers (including K. Marx) tried hard to prove that philosophy is science, which did philosophy an ill turn, robbing it from its specificity and demonstrating its complete inability to solve problems that are not philosophical in character.

To justify his choice of “monistic idealism” as the only true philosophy of consciousness, Goswami has to demonstrate that any other approach would encounter severe difficulties that only his idealism could overcome. However, to do that, he chooses (either deliberately or due to poor knowledge of philosophy) the most primitive kinds of philosophy, avoiding any heavy-weight opponents.

“material realist view (the ontology that everything arises from matter and its correlates, energy and fields).”



“Matter” in the narrow sense (mass, energy, fields) is mixed with the philosophical category of “Matter”. Hence reduction of materialism to primitive mechanistic views. This is the only kind of materialism any idealist can fight with: consistent (dialectical) materialism is a much stronger opponent, and idealists prefer to never mention it. The very wording like “material realist” instead of “materialist” is a concession to idealism; however, Goswami cannot consistently keep within idealism too, as will be shown below.

“Material realists assume that these mental properties emerge as higher order functions of brain-matter – mind is the software function of brain hardware.”

“Material realism” = vulgar materialism, the only kind of materialism Goswami knows about. In dialectical materialism, “mental properties” do not “emerge” as any brain functions; rather, consciousness is a form of the social development, which is quite objective and always embodied in material things.

“And if consciousness can collapse the quantum wave, can such a consciousness be made of matter, be an epiphenomenon of matter?”

From *Encyclopedic Dictionary of Philosophy* (Moscow, 1983):

“Treatment of consciousness and mental phenomena in general as epiphenomena is also characteristic of vulgar materialism and behaviorism. The mental thus becomes robbed of its specificity and reduced to the processes passively accompanying physiological functions, behavior etc.”

That is, Goswami can only fight the ghosts!

“Who/what chooses which possibility is manifested in a particular measurement? If choice is involved, is consciousness?”

There is no need to choose. Things just happen, and we observe them. If we are clever enough, we can make things happen sometimes, though rarely in the way we would like them to happen...

“in material realist cognitive science, it is not easy to formulate a paradox-free distinction between the unconscious and conscious that also agrees with experimental data”

First, the identification of natural science materialism with cognitive science is inadmissible. Second, the distinction between consciousness and the unconscious does not introduce anything special into materialist philosophy, since both are the aspects of material motion. Finally, philosophy does not deal with experimental data, and science cannot be materialistic or otherwise.

Since any questions can only be formulated from a definite position, an improperly chosen standpoint is bound to lead to ill-formulated questions and illusory problems. That is, Goswami’s philosophy is based on the fake premises, the “necessity” to solve problems that do not exist.

“experience consists of a perceived split of the world into one part (the subject, which may sometimes be implicit) that experiences the other part (object) as separate from it. How does the one world of matter separate into two, subject and object?”

Experience does not “consist” of the “perceived split” or anything like that. It just reflects the world as it is in certain kinds of human activity. There is no separation of the world into object and subject – these are the two sides of the same material process, activity. Any opposition of the object and the subject can only be relative: in any conscious activity the subject is nothing but a specific object (due to people’s communication, and self-communication in particular), and both the object and the subject become merged in the product of activity. It is the inability of some philosophers to comprehend the mutual transformation of the subject and object into each other, which leads to any “problems” like that.

The world does not “separate into two”, it remains the same all the time, merely exhibiting different facets of its hierarchy in different situations. The integrity of the world implies that the distinction of the object and the subject can only be relative, and there is no sense in trying to ponder much over an

abstract dichotomy.

The very wording is a tribute to subjective idealism, since Goswami cannot imagine anything beyond his own experience, and hence has no intention to explore the world, being content with superficial observations.

“But how do we explain this oneness, the binding problem?”

There is no problem at all. Any coordination of internal processes in any system arises from the its involvement in a higher-level process occurring between the system and its environment. Human experience is an example of such an integrating process. For another example, take a radio set that integrates many components serving the same goal: to produce sound from high-frequency electromagnetic waves.

“there is commonality in the intentionality of our experience, there is also undoubtedly a subjective quale. How can a subjective quale be explained from a science which is avowedly purely objective?”

Once you have opposed the subject to the object, you have to stick in irresolvable problems. As soon as you consider conscious activity as transformation of the object into the subject and back, and the products of activity as a synthesis of the object and the subject, there is no problem at all: science deals with products, and hence both objectivity and subjectivity incorporated in them. The “pure objectivity” of science is a myth, as well as its incapability to “transcend” the barrier between the mind and the world – there is no barrier, nothing to transcend. Also, science does not explain anything, it only suggests models.

“The implicit or explicit subject of our local experiences is a local, personal *I* that we call the ego. But the implicit subject of the non-local experience is neither local nor personal; it is non-local and transpersonal. This two-level self-identity (Maslow, 1968; Assagioli, 1976) connected to experiences needs an explanation.”

An artificial construction does not need any explanation. There are no local experiences at all. The very idea of experience implies the unity of “inside” and “outside”, a projection of global motion onto a part of it. Since the subject is a social phenomenon, it would be incorrect to speak of its localization in the physical space-time: it can only be localized, to certain extent, in its own configuration space of a quite different kind.

Different levels of the subject have been long since introduced in philosophy and psychology. That a social group may function as a collective subject is a trivial observation – however, there is no need to consider such collective forms of consciousness as something mystical and inaccessible to regular scientific study.

“The material realist ontology assumes that all causation is upward; causal potency, in this view, ultimately rests with the reductive elementary particles of matter and their interactions.”

Primitive materialism may insist on the absoluteness of causation. However, this is not so with dialectical materialism, which admits that the very distinction of the cause and its effect can only be relative due to their mutual penetration and transformation into each other. To formulate the problem like that is to get trapped in the logical loop of the hen and the egg.

“Yet, we experience real freedom when we are creative, when we are compassionate, when we make moral decisions. This implies downward causation – causal potency that originates with us, whatever *us* is. This is a very difficult question for material-realist science.”

This is no question at all. Why producing any event by humans should drastically differ from one thing influencing the motion of another? Humans are as material as any other thing, and there is no difference in the type of causation. Of course, if one admits a priori, as Goswami does, that consciousness is something unrelated to matter, this false assumption may raise numerous problems; in that context, ascribing such imaginary feature like “downward causation” (whatever it means) to consciousness is an entirely arbitrary decision.

Different levels of material motion have their specific form of causation, and freedom is one such

form characteristic of the social form of motion. There is no opposition of freedom to other forms of causation, and no reason why it should be called “downward”. On the lower levels, higher-level causation will produce nonlinearity of a definite type, such as dependence of the system’s dynamics on its integral characteristics, constraints, boundary conditions etc.; however, this does not add anything unusual to causality as such.

“Last but not least, the question of the mental as opposed to the physical aspect of an experience:”

An entirely artificial opposition.

“Experiences consist of intentionality toward an object, but the physical object is not the only object. There is also a mental object in practically every event of conscious experience. A simple example is when I see a rose I also concomitantly experience some such thought as: I see a rose. And I experience this thought not in the ordinary, public physical space of the rose but in a private, mental space that we call awareness. Can mental objects arise from the purely physical?”

This paragraph contains a whole bunch of artificial problems arising from a number of arbitrary assumptions. First, the word “intentionality” is used in a rather frivolous manner that may cause confusion in an inexperienced reader. Second, the introduction of a “mental object” is too abrupt, so that one cannot tell what is meant by the term and assess the validity of the rest of the sentence. Further, an arbitrary distinction of the “physical” and “mental” spaces is most problematic, and hence the question of “mental objects” arising from “purely physical” (why should they be “pure”?) hangs in vacuum without any justification.

Well, we can be aware of ourselves, and there is no problem in the materialistic approach: since consciousness is an aspect of material motion, one can experience one’s conscious activity as well any other object. The important specification added by dialectical materialism is that any thing has to be *made* an object before it comes to experience, and hence it must be a product (this is the exact sense of any “intentionality”); the same holds for one’s consciousness: it cannot be consciously experienced until it becomes embodied in some products of human activity. This is the only solid basis for studying self-consciousness.

It should be noted that the concomitance of one’s being aware of one’s perceptions with the perceptions themselves requires a more careful attitude. Self-perception is a specific activity, and its ability to proceed in parallel with some other activities (e.g. perception of a rose) is determined by numerous circumstances to be specially discussed. Normally, seeing a rose, we do *not* think about our seeing it, and it requires an attention shift, to become aware of looking at a rose, which would immediately stop seeing a rose, while still looking at it. Under certain conditions, switching activities may become recurrent, resulting in an overall coexistence of two conscious impressions – just like two threads in a personal computer under Windows coexist through system resources being repeatedly allocated to either one process or another. With consciousness, this not the only mechanism, and there may be many others – however, there is no need to invent artificial problems around that.

## 2. Monism?

As I already said elsewhere, idealism can never be consistent – otherwise it becomes indistinguishable from materialism, translated into a different terminology. If one does not admit something existing on itself as the only source of both consciousness and its contents, one has to admit that there is something else that cannot be related to this source, and hence come to dualism. If a single origin of all things is assumed, it should be called matter rather than idea, spirit, mind, consciousness etc., since there is no distinction yet that could make such a universal origin resemble consciousness, and one still has to derive consciousness from it.

Therefore, one could expect that the idealistic monism Goswami puts forth is in fact sheer declaration, without any real monism being developed. Indeed, this is what we find in Goswami’s texts; even worse, there are all reasons to regard them as a dualistic approach, a variety of psychophysical parallelism. Goswami has never been a philosopher enough to become aware of that.

“If transcendent consciousness is always looking and collapsing”

Looking at what? The very form of the phrase assumes that there is something to look at and something to look.

“The solution is to realize that consciousness collapses the possibility wave only in the presence of an immanent observer.”

First, Goswami declares that everything comes from consciousness, and there is nothing else, and then he needs an observer to assist it in collapse...

“Notice how, in this description, dualism is avoided because ultimately there is oneness (the division is only an appearance), allowing subjects and objects to be treated on the same footing.”

That is, there is “oneness” and there is its apparent division – appearance to whom?

“The subject has downward causation that comes from its freedom of choice to collapse actuality from possibility, creating manifestation.”

The opposition of the object and the subject, is implicitly built into Goswami’s approach, and there is no indication to how they could be attributed to the same origin. Other oppositions (actuality and possibility, motion and its manifestation) do not show any tendency to become synthesized too.

“The two paradoxes, self-reference and quantum measurement, find simultaneous resolution under the idealist ontology if we posit additionally that the brain has quantum machinery in addition to the neuronal machinery that act as amplifying measurement apparatuses for the quantum.”

Goswami declares that everything comes from consciousness – and, all of a sudden, he feels the necessity of attaching consciousness to the brain and inventing some machinery behind it. Why there should be any brain, if a consistently idealistic monism is to be advocated?

“Dualists, to their credit, have always insisted that mind and brain are fundamentally different (Eccles, 1994). Their legitimate claim...”

To what extent is it legitimate? Anyway, Goswami is likely to admit the difference.

“Thus it makes more sense to hypothesize that consciousness *writes* the purposive mental programs in the brain.”

That is, there is the brain (whose brain?), and something called consciousness that works as a programmer for the brain. If consciousness is a social phenomenon, there is no problem: the society moulds the thoughts of its members. However, if consciousness is fancied to have no material grounds, this becomes sheer dualism.

“When we write software for our personal computer, we employ our mental picture of what we want to do in the programming. Similarly, consciousness must use a *mental body* to create the mental software of the brain.”

The perfect picture of consciousness as a homunculus. In fact, when we write computer programs, we are driven by a social necessity (embodied in the objective process of social development), and any “mental pictures” are mere reflection of that necessity in a different substrate. There is no need to invent any immaterial “mental bodies”.

“this subtle substance does not interact with the material substance in any direct way;”

Why? No argument for that, except the a priori assumption that it must be “subtle” and mystical. The only explanation: the dualism of “two substances” is a cornerstone of Goswami’s teaching.

“we are not reviving Cartesian interaction dualism.”

This is exactly what Goswami does! Two substances that do not interact, except in one specific organ of the human body... – this is a replica of Descartes.

“And yet the subtle substances can communicate with the physical substance through the intermediary of consciousness.”

Which is nobody knows what... The only difference from Descartes is in that the latter linked the

mind to the body through a material organ, the pineal gland, while Goswami tries to picture an immaterial link without much bothering about the feasibility of such linking.

“Psychophysical parallelism avoids the problem of interaction between the two different substrata, but no mechanism is given for the parallelism to come about. The current model, with two separate substances that are connected via consciousness which simultaneously collapse parallel actualities in both bodies, gives a mechanism for psychophysical parallelism.”

Well, to join two opposites one has to introduce something that would implement the junction. However, Goswami never tells how consciousness is to do that – mere declarations are not enough. The very opposition of the “two substances” remains absolute throughout Goswami’s writings.

“Consciousness ascribes mental meaning to the image with the help of mental states of the mental body”

One homunculus riding another.

“When consciousness recognizes a learned state in its quantum possibilities of the physical brain, it also recognizes and chooses the correlated mental state.”

Once again: “consciousness recognizes”, “consciousness chooses”. Why not simply say that a person can consciously choose or recognize? Anyway, Goswami cannot tell more about what consciousness is and how it does all that.

“Note that the new hypothesis is postulating a new psychophysical parallelism, but firmly within a monistic idealist ontology.”

Lack of elementary conscience: “I am a dualist, but within monistic idealism”. No comment.

“only then, when consciousness recognizes and chooses a correlated pair of states of the physical brain and the mental body, is a meaningful representation made.”

Three independent entities: the brain, “mental body” and “consciousness” – this really transcends dualism!

### 3. Idealism?

Just like Goswami fails to develop his “monistic idealism” as monism, he fails to be consistent enough in idealism itself. Primitive mechanistic materialism shows from every hole of his eclectically ragged approach.

“If two people simultaneously make an observation, whose choice counts (a slight variant of this paradox is sometimes called the paradox of Wigner’s friend)? Neither’s counts. Consciousness is one, unitive (see also, Blood, 1993). Our separateness is only an apparent one (see later).”

Why then should we call it consciousness? Why not call it matter and say that everything comes up from matter rather than consciousness?

“The stimulus is processed by the sensory apparatus and presented to the dual quantum system/classical measurement apparatus.”

If everything comes from consciousness, why anything should be presented to anything else? There is no need to talk of any “quantum measurement” at all.

“the brain has quantum machinery in addition to the neuronal machinery that act as amplifying measurement apparatuses for the quantum.”

An attempt to identify “the quantum” with “the ideal” fails, since the existence of the (material) “neuronal machinery” is admitted anyway.

“all objects are quantum objects; therefore, a classical measurement apparatus can never really *measure* a quantum object. It itself is described by possibility waves and thus cannot resolve another object’s possibility wave into actuality.”

NB: objects. Also, “possibilities” and “actualities” look quite objective in this context.

“Before learning, the possibility pool from which consciousness chooses its states spans the mental states common to all people at all places at all times.”

If everything arises from consciousness, why should there be any other people and other times? And what consciousness would choose?

“Fairly early in our physical development, learning accumulates and conditioned response patterns begin to dominate the brain-mind’s behavior,”

That is, there is physical development, learning etc. When an object develops according to an objective law that can be expressed with an equation (quantum or not), where is idealism?

“Experiences lead to learning, one aspect of which is developmental changes in the brain-mind’s classical substructure”

What learning, if everything comes from the mind? Why should an idealist care for any material traces of experience?

“At this stage, the creative uncertainty as to *who the chooser is* of a conscious experience involving the quantum self diminishes. Then we begin to identify with a separate, individual self, the ego, that perceives apparent continuity in the form of a stream of consciousness, that thinks it chooses on the basis of its past experiences, that presumably has *free will*.”

That is, there are different people, with their individual consciousness, and will. And further:

“Suppose you have several people experience the sight, sound, and touch of a red car with its engine running.”

Once again: the subject (“you”) and the object. Any attempt to apply to science results in that distinction.

“Any deviation from this estimate will tell us about quantum interference and thus about the quantum nature of the probabilities and, thereby, of choice (Woo, 1981).”

What this entirely objective approach has to do with the absolute idealism proclaimed?

“However, there are some uncertainties in doing such an experiment ; for example, how do we guarantee that a subject retains the dichotomy (i.e., doesn’t make a choice) between seeing the first word and the second? In fact, if the idealist interpretation of quantum mechanics is correct, then each sight-recognition collapses the ambiguity of the stimulus.”

What has all that to do with idealism? This is an arbitrary assumption in an abstract pseudo-physical model.

“But the difference is that in the former case, as soon as the wave function is collapsed by measurement, the objects become uncorrelated; but in the case of the correlated brains, consciousness maintains the correlation over the one-hundred light flashes that are needed to get the average evoked potential.”

The style of this description does not imply any idealism. If there is only one consciousness, how does it come to different subjects?

“However, the new model is different from the old psychophysical parallelism in the sense that experience modifies both bodies as states of the two bodies become correlated by experience.”

First declaring that consciousness does that, Goswami would toss the task to “experience”, whatever it means.

“When consciousness recognizes a learned state in its quantum possibilities of the physical brain, it also recognizes and chooses the correlated mental state.”

Yet another turn: “consciousness recognizes”, “consciousness chooses”. This implies that consciousness is objective too, and we can describe it in a language like that.

“a subject *sees* enough to act on the basis of it, but is not conscious of the seeing”

One more confirmation that there is something beyond consciousness.

“This question, I think, can be answered with an even more decisive and objective experiment that can discern between classical and quantum models of the mind.”

Fine! A monistic idealist believes in an “objective experiment” that would tell the truth.

#### 4. *Transcendental logic*

Since most of Goswami’s philosophy is sheer declarations, there is no attempt to logically link one idea to another. Quite naturally, such an approach can hardly lead one to any knowledge, and hence Goswami’s sympathy towards anything transcendental, mystical, extra-sensory, or super-natural.

“Who/what chooses which possibility is manifested in a particular measurement? If choice is involved, is consciousness? And if consciousness can collapse the quantum wave, can such a consciousness be made of matter, be an epiphenomenon of matter?”

No logic. Why should the presence of choice hint to consciousness? Why should choice mean any “collapse”? Why should one ask whether consciousness is material or not? Why should any “epiphenomenon of matter” be “made of matter”?

“Consciousness can collapse the whole conglomerate because it transcends the material universe.”

An empty “because”: one incomprehensible thing is arbitrarily said to follow from the another. Goswami does not explicate neither “collapse” nor “transcendence”, and even less “consciousness”.

Once an idea has nothing to do with reality, one has to invent some “transcensus”, to connect it to reality. But once there is a connection, there is no need to distinguish one “universe” from another, since they are parts of the same thing. with no transcendentality.

“There is now data showing unconscious perception – a subject *sees* enough to act on the basis of it, but is not conscious of the seeing. Unconscious processing is also acknowledged as part of the creative process (Wallas, 1926), and much evidence exists in favor of it (Goswami, 1999)”

The importance of the unconscious for creativity is a banality. Moreover, it is a trivial fact that any human activity at all implies both conscious and unconscious levels. Materialist science has long since incorporated the idea of the unconscious (Vygotsky, Leontiev), not only using it to explain the observable behavior, but also to provide a conceptual basis for personal development, education, etc.

The distinction between the conscious and the unconscious is as relative as the distinction between the object and the subject, or the inner and the outer. There is no problem to distinguish between consciousness and the unconscious – rather, the problem is to show how they transform into each other.

“So, if a tree falls in the forest, is there a sound if nobody is there to hear it? Centuries ago, Bishop Berkeley said that God is always in the *quad*, in the forest, to hear the sound, so the sound is there. But not so with quantum measurement.”

What’s the difference? Why some imaginary being (“god”) cannot be imagined the way as to make it present in any quantum state as well as in any spatial position simultaneously? This won’t go along well with physics, but nobody expects mystical thinking to be compatible with science.

“The measurement is tangled-hierarchical and produces self-reference. An example of a tangled hierarchy is the self-referential sentence, *I am a liar*. Neither the subject nor the predicate of the sentence is the top-level, each qualifies the other (Hofstadter, 1980). This tangled hierarchy causes the self-reference of the sentence (for further details, see Goswami, 1993).”

Self-referencing is a fundamental feature of every thought, and it must also be considered as the basis of any development in the material world, since it is unique, and hence any interaction in the world is the world’s interaction with itself (self-reflection, self-motion, self-action, self-production etc.). Within the binary logic, this reflexivity cannot be adequately addressed, which demands extending

our ideas of logic. However, there is no need to admit that there should be something mystical about it. Once you connect consciousness to activity, you will readily observe that it is the schemes of activities that get reflected in logical figures, so that different activities may imply different logic.

“Objects have upward causation by virtue of the laws of quantum possibility dynamics that they follow.”

Causation has nothing to do with science, including quantum physics. In developing a scientific theory, one may use certain methodological principles (which are philosophy rather than science); however, science can never answer philosophical questions, including that of causation.

“the simultaneous co-arising of the choosing subject and the experienced object defines the collapse”

This is collapse of logic. The subject and the object do exist through each other, and get determined through each other, but why should this be called “collapse”? In dialectical philosophy, any distinction evolves from original syncretism, and then it has to be “dissolved” on a higher-level formation combining the features of the both opposites. In human activity, this general law manifests itself as the contribution of both the subject of the activity and objects involved in it into the formation of the product of activity (e.g. the results of an experiment).

“One of the principal aspects of quantum functionalism is non-locality.”

What Goswami means under non-locality has never been explained. There are different types of non-locality in science, and it is not evident whether it is justified to borrow the term in philosophy.

“only then, when consciousness recognizes and chooses a correlated pair of states of the physical brain and the mental body, is a meaningful representation made.”

The word “consciousness” is used for “god”, “supreme power”, “fate” etc.: when Goswami does not know something, he just says that it is consciousness that does it. This is the simplest explanation one could ever invent.

“This is the reason that the ontology used here, monistic idealism, has also been termed perennial philosophy.”

This is not a “perennial philosophy” – this is a long-lived delusion, not to say lie, which is supported by certain social layers, being bound to get annihilated with them. Perennial ignorance would be a more appropriate name.

## **NO CONSCIOUSNESS**

Since Goswami’s approach is neither science nor philosophy, and the only art that may have any relation to it is the art of artifice, one can hardly expect to learn anything new about consciousness from it, that would not be present elsewhere in the literature, in a more coherent form.

### ***1. Ghosts in the Mist***

Goswami’s acquaintance with psychology and related studies is as superficial as his knowledge of physics. In combination with his being trapped in artificial problems of his own design, this leads to a rather vague statements about commonly discussed psychological phenomena.

“Experiences lead to learning”

Well, everyone should learn from one’s experiences; a conscious person also learns from the experiences of the others. However, Goswami has only learned a variety of behaviorism that never comes beyond primitive conditioning.

“A well-known characteristic of learning is that learning a performance reinforces the probability of the same subsequent performance.”

This is partially so with conditioning in animals. Those humans who have developed a little consciousness exhibit an entirely different behavioral pattern: well learned performance gets reduced, interiorized, and it is unlikely to often re-appear as conscious action.



“we can be consciously aware at any given instant of only one particular thing.”

This is not so. We are aware of myriads of things at any given instant; however, these things are not equal for consciousness. Consciousness is hierarchical, and things can participate in its formation differently. One cannot draw a boundary between what we are aware about and unawareness.

Any activity implies that some things are in the focus of awareness, and some other occupy its periphery. Thus, speech is normally sequential, and one cannot report of one’s feelings in words otherwise than one by one, which may make some people believe that feelings are sequential on themselves. Luckily, there are other ways of expressions (e.g. the arts) that disclose the hierarchical nature of our “internal” life.

“In the quantum functionalist scenario there is only one collapse at a given time, and that defines the event in awareness.”

There are cases of split awareness, well described in the literature. Concurrence of a few motives with the subsequent prioritizing them is a common mechanism of switching between different activities. Further, Goswami himself admits that awareness is not flat: “we can be peripherally aware of several things in awareness at the same time.” However, one should take care while speaking of time: simultaneity is relative already in physics; the more so with human beings.

“Ordinary perception consists of the collapse of a possibility wave by consciousness (via recognition and choice) in the presence of awareness.”

Consciousness and awareness are not separate in ordinary perception; they are not only present in it, but constituting one of the necessary components.

“But in unconscious (subliminal) perception,”

The subliminal may well be conscious (e.g. in intuition), and the unconscious may be not subliminal (e.g. the super-conscious, the zone of imminent development suggested by the society).

“Apparently, choice, and therefore quantum collapse, is a concomitant of conscious experience but not of unconscious perception. It is our consciousness that chooses – we choose, therefore we are – but we choose only when awareness is present.”

This is entirely wrong. There may be unconscious choice – and in most situations this is the case. Also, identifying consciousness with choice would mean that humans are nothing but animals, since the animals choose too. Finally, consciousness does not reduce to awareness, and the unconscious to the lack of it. A cat may well be aware of the presence of a mouse – and behave adequately – which would not make it conscious, however.

“The implicit or explicit subject of our local experiences is a local, personal *I* that we call the ego. But the implicit subject of the non-local experience is neither local nor personal; it is non-local and transpersonal. This two-level self-identity (Maslow, 1968; Assagioli, 1976) connected to experiences needs an explanation.”

The arbitrary opposition of “local” and “non-local” experience leads to imaginary problems. Artificial constructions do not need any explanation.

With consciousness, there is no locality at all. The very idea of experience implies the unity of “inside” and “outside”, a projection of global motion onto a part of it.

Since the subject is a social phenomenon, it would be incorrect to speak of its localization in the physical space-time (which is the only kind of locality Goswami is aware about); well, one could approximately localize the subject in the Solar system, until humans overcome their being confined within it – even that would be a strain in describing consciousness. To certain extent, the subject can be localized in its own configuration space, quite different from physical space-time.

“attribute properties of consciousness – experience and choice – to the mind.”

Conscious experience and conscious choice are specific activities, and not mere properties of something poorly defined; rather, consciousness could be said to be their specific “property”,

distinguishing them from animal awareness and choice. Even less probably one would wish to attribute experience and choice to the mind as its properties – though there may be study of the relations between the mind and such psychological phenomena as affects and will. And, of course, experience and choice do not exhaust all the cases of conscious behavior.

“Mind, on the other hand, is program-like – it is driven not only by causes but also by purpose.”

A whole armful of nonsense! During over 30 years of computer programming, I never met a program that would be “driven” either by “causes”, or by any “purpose” – and I doubt anybody could show me a program like that. Programs are composed (by humans or other programs), compiled (according to certain directions) and executed by a processor – that’s all. Purpose has nothing to do with programming; it may only concern their usage.

Mind is not “driven” by anything neither, if just serves human activity. Within a particular action, a relatively short sequence of operations may be planned in a “program-like” manner – however, this not the usual way human behave. That is why all sorts of external tools (e.g. computer programs like Lotus Organizer, Microsoft Project etc.) have to be used when there is a rigid scenario to follow. In certain kinds of society, people may become reduced to machines, with special techniques designed to keep them below the level of creativity and consciousness. Work around the clock for mere survival is a quick way to an animal state.

“Out of the self-referential measurement itself simultaneously arise a subject – which I call the quantum self – that measures, that chooses, that observes, and object(s) that are observed.”

The subject does not arise from any measurement; it merely *performs* measurements, when needed. It is the history of natural development that eventually leads to the formation of subjectivity (and hence objectivity, as its complement). By the way, why the subject should “arise” from quantum measurement only, and not from mechanical, electrical, thermodynamic or other measurement?

“But then where does the purposiveness of mind come from? Logic dictates that only consciousness can inject purposiveness in the world.”

There is no need to “inject purposiveness in the world”, since there already are people who consciously act and follow their purposes. Studying how they differ from consciousness-devoid creatures will provide the clues to what consciousness is and how it develops with the world and human society as its part.

“Thus it makes more sense to hypothesize that consciousness *writes* the purposive mental programs in the brain.”

This makes no sense at all. As for programming the brain, consciousness has little to do here, since economy and society do it better. Anyway, nothing gets “written” in the brain – there are other mechanisms, such as teaching, education, social conditioning etc.

“So who teaches the human biocomputer, the physical brain, its representations? Well, consciousness does – with the help of the states of the mental body.”

To translate: something we know nothing about. Goswami cannot think of the other people as real teachers, and he invents an abstract “consciousness” (= “god”) to do that. Maybe, while working as a teacher, Goswami could not teach anything to anybody, so that his denial of people’s ability to teach is due to that disappointment?

“An unlearned stimulus produces an image in the physical brain in the form of possibilities of the quantum brain, but these possible images have no mental meaning.”

The “possibilities of the quantum brain” have no meaning at all. The human brain has developed as a device to relay a number of external stimuli and control the human body, and this all it can do on itself. Outside a social context, there can be no experience, meaning, or consciousness.

“In the reciprocal process of imagination, a physical brain-mind representation is made of subtle mental states.”

Thus! A physical representation is made of ideas. In a normal language, one would simply say that people's imagination is accompanied with changes in the brain state (which is trivial), and the things imagined may be not directly related to anything the person perceives; the latter does not mean that they come from something mystical. "Mental states" do not need to be "subtle" – they are material states of a material system, the society.

"With learning, certain responses gradually gain greater weight over others, responses that we call personal."

That is, an ameba's light avoidance reflex reveals the ameba's personality! A good company for Goswami and his ilk!

## **2. Phrenologist, or Skull-Teller\***

Cognitive science (which is, in fact, no science at all) is the only approach to consciousness study known to Goswami, and all his ideas are firmly rooted in that school, ascending to late F. I. Gall and his "science" of guessing the character and talents of a person by the form of the cranium. In the 70s of the XIX century, the idea of the localization of various higher functions in the brain has been extensively developed by a number of researchers (like P. Broca, or C. Wernike), and one could also mention the detailed maps by K. Kleist (1934). In the second half of the XX century, speculations around the functional asymmetry of the brain were popular, and there were attempts to "localize", for instance, logic in the left, and artistic gifts in the right hemisphere. Combined with computer modeling, such views gave birth to cognitive science, an activity of collecting facts and notions of different sciences (physics, biochemistry, neurophysiology, psychology, artificial intelligence, etc.) and reinterpreting them in the phrenologist way.

The very title of one of the sections of Goswami's article, "The Possibility of Quantum Interference in the Brain-Mind", admits that the mind is entirely linked to the brain. Thus Goswami starts at a wrong place, and moves in a wrong direction.

"An experience usually involves several brain areas"

This is wrong. Experience has nothing to do with the brain, it is a kind of activity that is merely accompanied with certain cerebral processes, which might as well be reproduced in another device, made using a different technology.

"Experiences lead to learning, one aspect of which is developmental changes in the brain-mind's classical substructure – the memories and representations of experience."

This multiply quoted sentence is, in addition to all the other conceptual distortions, also an example of the implicit identification of the mind with the brain. Human memory is entirely different from mere imprinting external stimuli in cerebral structures, since it is based on cultural mediation, self-communicating via the other people and the products of human activity.

"the oneness of conscious experience is hard to debate. But how do we explain this oneness, the binding problem?"

There is no problem at all. Any coordination of internal processes in any system arises from the its involvement in a higher-level process occurring between the system and its environment. Experience is an example of such an integrating process. Any attempt to confine experience in the skull is bound to produce fictitious problems like that.

"Suppose also that you have available to you the right combination of some super technology and high-power mathematics so that you are able to make a complete description of the neuronal states of the brains of your subjects, even one for your own brain, upon experiencing the car. Except for minor differences, you would expect the neuronal configurations of all the brains, including yours, to be

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\* The title of a satirical theatre play by Kozma Prutkov, a bright personality who had never inhabited a human body, but managed to write prose and poetry that received tremendous popularity in Russia; his aphorisms became a significant part of the Russian language.

identical.”

This is nonsense. One does not need to have identical systems to achieve the same functioning. For instance, I can view the same Web page on an Intel-based PC, on a Macintosh, on a SUN workstation, or any other computer, without significant differences in the apparent performance. Physiological systems are no exception. It is the way of the different systems’ participation in a common process that determines the way they reflect each other’s individuality.

“And yet, you know that in the case of your brain, something is left out, something that the objective neuronal configurations cannot possibly describe, and that is your subjective experience as observer.”

Why? The subjective experience can well be included in the description, this is an ordinary instance of self-reflection. Once again, it is the confinement of consciousness to the brain that would cause conceptual difficulties.

“You might say that this comprises something special in the neuronal configuration of your observer brain compared to all the observed brains.”

In no way. Any manifestation of human individuality would only mean that your role in the common activity is different, and hence requires a different physiology to effectuate it. Change one’s social position, and you will find a different personality, and rearranged functioning of the brain.

“But then you would be admitting (barring solipsism) that your conscious experience of your brain state changes your supposedly objective brain state.”

If Goswami had ever known physics better, he would have been well acquainted with the idea of self-consistency widely used to describe many-body systems. The same approach could be used to derive models of conscious activity, in particular employing some methods of quantum mechanics.

Here, Goswami becomes trapped in his inability to distinguish a model from the object modeled. There have never been a person directly perceiving the state of his own brain, as well as there can be no self-awareness that would not be mediated by interaction with external bodies, products of human activity. In self-reflection, any simultaneity can only be an abstraction of a very limited applicability.

“This is the paradox of self-reference back again”

Where is the paradox? Any system with feedback can show tricks like that.

“Yet the subject consciousness of the experience (the subject pole with the qualia of experience) arises co-dependently and tangled-hierarchically with the chosen brain-state (the object pole)”

Here, the brain state is inappropriately called the object pole, while, in reality, it is productive activity and communication with other people that constitute the substrate of any subjectivity.

“Non-local consciousness collapsing correlated quantum wave functions at different brain areas, simultaneously giving rise to an event of felt experience, is the simplest answer to the binding problem.”

As soon as you abandon a perverted idea of localization of mental functions in the brain, there is no problem, and no need to invent fictitious answers. Once again, poor acquaintance with physics results in lack of understanding of that there are no perfect points in neither space nor time, and any simultaneity may only imply a “very short” time interval, with the meaning of “very short” determined by the characteristic times of the process under consideration. Thus quantum processes in atoms and molecules occur simultaneously (“in no time”), compared to the typical time of a neuron activation; however, these processes are infinitely long compared with the typical times of nuclear events, as described by quantum chromodynamics.

“But there is a second part to the mind-body problem. It is about the *mind* that mind does – thinking, feeling, and so forth.”

Where is the problem? That a person (not “mind”) can feel, think and wish, is a trivial fact. If it does not fit into a theoretical scheme, the scheme should be thrown out and replaced with a better one.

“The programs of the mind can be simulated by computer algorithms, hence the temptation of assuming that mind is reducible to matter, and *mind is brain*.”

To follow the computer analogy, one would thus conclude that software = hardware, which is an obvious nonsense. There is difference between the programs, their representation in the computer, and the computer itself. In any case, the very idea of programmable mind is rather a play of mind than an approach to develop – unless it is well paid by those social layers that would like programming other people as obedient servants.

“One type of model of the quantum in the brain-mind posits a superfluid-like coherence in the movement of a constituent matrix (Stuart et al, 1978; Lockwood, 1989) arising from the interaction dynamics of the many-body system. The latest entry in this field is the work of Hameroff (1994) who sees this coherent build-up in the structure of microtubules within the brain cells (see also, Penrose, 1994).”

The arbitrary idea that consciousness resides in the brain leads to as arbitrary constructs to somehow explain it. It is trivial that the brain (together with the rest of the human biological body) functions as a whole within a definite operational context, but this operational integrity comes from the outside rather than the inside of the brain, which is especially so for conscious activity entirely dependent on the cultural environment.

There may be cases of the applicability of the same formal models in quite different systems. The universality of the (un)harmonic oscillator model that is used to describe anything from elementary particles to social systems is one example. In particular, one might find that certain aspects of brain operation accompanying some conscious activity could be described with a particular physical model. There is a lot of such models that all have right to exist, within their applicability range. Purely mechanical models (Korenev, 1977; Ivanov, 1989) work as well as quantum control models (Ivliyev, 1986), and there may be complex hierarchical models involving the elements of quantum descriptions at a higher level (Avdeev & Ivanov, 1993)\*\*. The pretence of some authors to have found the ultimate truth in one of the possible models is as absurd as reducing all the human psychology to sexual behavior.

“Stapp (1993) also thinks that quantum processes play a key role in the release of neurotransmitters from vesicles into a synaptic junction. An action potential pulse opens channels for diffusion of calcium ions into the vesicular release sites. But the calcium ions are of small enough mass, and thus their diffusion has a quantum nature.”

What has all that to do with consciousness?

“How does an electrical impulse pass from one neuron to another across a synaptic cleft? Conventional theory says that the synaptic transmission must be due to chemical neurotransmitters. E. H. Walker (1970) thinks that the synaptic cleft is so small that quantum tunneling of electrons may play a crucial role in the transmission of nerve signals. Eccles (1986, 1994) has discussed a similar mechanism for invoking the quantum in the brain – his *microsites* that mediate the quantum connection between neurons at the synapses do seem to satisfy the small-mass requirement of quantum behavior (Herbert, 1993).”

Even if we do not cut off such “theories” using the Okham’s razor, there is no reason to apply them to consciousness, since all they may be related to is brain functioning.

“A second type of model for the quantum in the brain-mind attempts to find carriers of relatively small mass so that their movement is adequately quantum to create the required ambiguity for consciousness to operate upon.”

Yet another fictitious means to resolve a fictitious problem.

“Many such quantum interactions occur in possibility at many synaptic sites. This gives the brain, upon amplification by other neural processes, a macroscopic possibility structure until one component

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\*\* I intentionally omit the exact references. These are not the only models one could find in the literature.

in that coherent superposition of possibilities corresponds to a state of macroscopic cognitive meaning that consciousness recognizes.”

There are no meanings in the brain. The only meaning something may have is related to its place in the culture, in the organization of human activity. More specifically, meaning refers to the standard operational schemes for implementing particular actions in the specific cultural conditions.

“self-reference is also the most important brain-mind paradox – how is it that we can refer to ourselves?”

There is no paradox, if the mind is not identified with the brain, in a vulgar way. Goswami does not give any answer; he just declares that there is “self-reference”, without any attempt to understand how it comes that we learn to refer to ourselves. Ignorance for ever.

### 3. *Subtle Fantasy*

Trying to overcome his phrenologist sets, Goswami has a vague feeling that there is something external to the brain that makes it function the way characteristic of a conscious person. This “something” is like a higher-level person – and an idealist tends to call it a “god” (or abstract “consciousness”, “idea”, “will” etc.). An idealist cannot see the society as the only (material) substrate of consciousness, and acknowledge the fact that social consciousness is born before individual consciousness, the former determining the development of the latter. This makes the models suggested within an idealist approach so weak and whimsical.

“Thus the analysis and explanation of mentation calls for a radical hypothesis: there is, in reality, more than one substance-body. (The word substance here is to be understood in the broad sense of a mode of being.) Along with our material body, we also have a subtle body consisting of a mental substance that also obeys quantum possibility dynamics.”

Omitting the absolutely irrelevant reference to quanta, one could be interested in that “radical hypothesis”. Indeed, delivering consciousness from the individual human body would remove any problems associated with the idea of localized mental functions. However, why that other body should be non-material??? The human physiological body is not the only material body in the universe, and if some material thing does not coincide with it, it is not necessarily mystical and incomprehensible, as the subtlety of Goswami’s reason would suggest. It is above a hundred years ago that the idea on the non-organic body of a conscious being as the carrier of consciousness has been put forward by K. Marx; many writers in the former Soviet Union developed this idea, and there are books written about that [e.g. E. V. Ilyenkov, “Dialectics of the Ideal”, *Voprosy Filosofii*, no. 6-7 (1979)] . This other body is in no way “subtle”, and it does not consist of any “mental substance”, but rather of the material products of human activity and the organization of the society allowing their purposeful usage.

“this subtle substance does not interact with the material substance in any direct way;”

Why? There is reason for that, except the a priori assumption that it must be something mystical and transcendental. Is it wise to introduce a new idea that would add nothing to our comprehension of the notions already available, since it is not related to them otherwise than in fantasy?

“And yet the subtle substances can communicate with the physical substance through the intermediary of consciousness.”

Indirect interaction is interaction too. If Goswami had known physics better, he would have recalled that all the fundamental interactions are mediated by specific particles/fields, and there is no “direct” interaction at all. However, as soon as we have interacting objects (and they become objects as soon as we draw them into our activity, specifically, that of cognition), we lose any scent of mystery around the carrier of that interaction, which is thus declared to be an object too, with the both aspects of any object (matter and its motion) applied. Unfortunately, this model of consciousness as an analogue of a gauge field in social relations has missed Goswami’s attention, and he prefers to leave the reader ignorant about what are those “substances” he “discovered”, and how they interact via consciousness.

“The mental body does what mind is for, thoughts and feelings.”

Fine! Instead of the well-known term “the mind”, Goswami introduced an awkward combination “mental body”, which, as he admits, does not differ from what is usually meant under “the mind”.

“The physical brain does what it is made for: movement in neurons that causes physical action.”

Without any reference to anything? Spontaneous movements without any reason? How can one speak of consciousness in such a context?

“one thing is certain: consciousness is needed to make actuality out of the possibilities that the dual quantum system/classical measurement apparatus(es) present.”

What a poor consciousness it would be, if it could manifest itself in only one of the millions of possible activities! Goswami’s castrated “conscious” being cannot live a normal human life, since all it can do is to perform measurements – sheer zombie! Well, somebody would pay well for the tools of zombying the others.

“At this point consciousness collapses that component of the uncollapsed coherent superposition, all the neurons involved in that meaningful state simultaneously fire, and a perception arises (along with a subject).

This rather hints on an erotic scene. Otherwise, there is nothing but one fantasy haunting another. Why should there be any collapse? Why do neurons have to react on it? What may this neural reaction have to do with conscious perception? Why does the subject have to be identified with perception?

“This includes our brain-mind. Consciousness can collapse the whole conglomerate because it transcends the material universe.”

This is how some writers distort simple things to prove nothing in the end, but bring in more confusion.

First, there is no mind in the brain, and their identification leads to more perversions: since the original idea has nothing to do with reality, the only way to connect it to reality is to also invent some incomprehensible “transcensus”. This is a kind of logical loop, which is well summarized in a Russian saying that could be roughly translated as: “You have run up against what you have been struggling for.” Goswami’s desire to “collapse” by any means drives him to the necessity of explaining this “collapse”, which, being entirely imaginary, cannot be explained otherwise than with more arbitrary assumptions.

Normal consciousness belongs to this (the only) world, and it does not have to “transcend” any barriers to comprehend it. It is only the insane consciousness of an idealist that can feed on ideas like that, and it is only in the societies of a definite type that such a distorted mentality can develop.

Second, the fact that conscious beings are involved in their activities (e.g. measurement) does not mean that their consciousness is the only source of any product of an activity (e.g. measurement result). In most cases, the conscious component is infinitesimal, compared to what happens following the natural laws, without any human interference.

Further, one can hardly cause anything with mere consciousness, without any material action. It is only material things that influence other material things. That is, to obtain any result at all, one has to change something in the world. That is how people act in reality, rather than in fantasy.

#### **4. Virtual Nothing**

Well, anybody may be mistaken, and one should judge by one’s achievements rather than errors. But are there any achievements, in Goswami’s writings? So far, all one can see is sheer declarations, arbitrary statements borrowed from other authors, and mystical feeling as a substitute for reason and rationality. After a reading like that, one’s understanding of consciousness does not improve by an iota, if not eventually destroyed by the conceptual confusion encountered.

“Consciousness is one, unitive (see also, Blood, 1993). Our separateness is only an apparent one”

There is no word about how anything could be obtained from that “unitive” consciousness (or rather “emptiness”?). How does it come to apparent separateness? And why should one consider it as merely apparent? And apparent to whom?

“The solution is to realize that consciousness collapses the possibility wave only in the presence of an immanent observer.”

Nobody can tell what that “collapse” thing is, and it does not make consciousness more understandable. One can only wonder what is meant under the “immanent observer” and how this new invention is related to consciousness.

“The subject has downward causation that comes from its freedom of choice to collapse actuality from possibility, creating manifestation.”

An arbitrary assumption that does not tell much about subjectivity. Replacing “freedom of choice” with “downward causation” is no explanation of anything, rather the inverse.

“What is quite reassuring is that these properties of consciousness – transcendence, unity, and self-reference, derived from the requirement that consciousness collapse the quantum wave function without raising any new paradoxes – are also the characteristics of consciousness that mystics from every age have declared based on their direct realization.”

One can derive anything from a false statement, as basic logic says. However, even with that, Goswami did not make a slightest attempt to “derive” any properties of consciousness, and this declaration is nothing but an entirely arbitrary assignment of a few attributes to an abstraction of “consciousness”, which does not become clearer after that. With the usual notions, one can hardly find “transcendence, unity and self-reference” to be any characteristic of consciousness, save superficial. On the other hand, why should these properties have any relation to mystics? Unity and self-reference are the indispensable attributes of anything at all in the world, and as for “transcendence”, it is an evident indication of the lack of unity, and one can omit it in a better approach.

“one thing is certain: consciousness is needed to make actuality out of the possibilities that the dual quantum system/classical measurement apparatus(es) present.”

Does that add anything to our understanding of what consciousness is for and how it manifests itself in human activity? Just as many poorly defined notions around a much more common idea.

“At this stage, the creative uncertainty as to *who the chooser is* of a conscious experience involving the quantum self diminishes. Then we begin to identify with a separate, individual self, the ego, that perceives apparent continuity in the form of a stream of consciousness, that thinks it chooses on the basis of its past experiences, that presumably has *free will*.”

One can call a solution of an arbitrarily designed equation “free will”, but this will not make it have any relation to consciousness and psychology. Phrases like “creative uncertainty” do not clarify the nature of free will.

“Consciousness can simultaneously collapse possibility waves in the correlated subtle mental and physical bodies of an individual.”

Consciousness is defined as something specially invented to collapse waves in a silly model that demands such a collapse. This is not the consciousness humans possess.

“In this way, perception produces not only physical representations or memory in the physical brain but also a tendency in the mental body for certain correlated states to collapse when a particular physical stimulus is presented.”

That is how the well-known notion of a perceptive set transforms in a person poorly acquainted with traditional psychology.

“Mental substance is subtle; it does not form gross conglomerates. In fact, as Descartes correctly



intuited, mental substance is indivisible. For this substance, then, there is no reduction to smaller and smaller bits; there is no micro out of which the macro is made of.”

This list of arbitrary assumptions can hardly give one a slightest idea of the nature of consciousness.

“we can never simultaneously keep track of both the content of a thought and where the thought is going – the direction of thought (Bohm, 1951).”

This has not been thoroughly proved. That some primitive people are yet unable to do it does not mean that a somewhat better developed consciousness cannot do it too.

“For thoughts, we can directly observe them without any intermediary, but the price is that thoughts are private, internal; we cannot normally share them with others.”

Two bits of nonsense. We can never directly observe thoughts; we do it through a mediating activity. We certainly can share thoughts with the others (at least with ourselves as models of other persons) – otherwise they cannot be called thoughts; it is when a person has troubles with sharing thoughts with the others that is commonly treated as abnormality.

“It is consciousness that chooses which possibility will manifest in actuality.”

Especially where it has never been present: in the cores of neutron stars, in a ribosome, in a cloud, in a lightning spark...

“Although there is commonality in the intentionality of our experience, there is also undoubtedly a subjective quale.”

A very “professional” sentence indeed! If it had ever had a slightest relation to the topic, it would certainly have been highly appreciated.

“Collapse consists of recognition and choice.”

Why should one use that pseudo-scientific talk to speak of phenomena that can be much clearer expressed in the normal language? Why not simply discuss recognition and choice as they are, as psychological phenomena, without any recourse to imaginary “collapse”?

“The two paradoxes, self-reference and quantum measurement, find simultaneous resolution under the idealist ontology if we posit additionally that the brain has quantum machinery in addition to the neuronal machinery that act as amplifying measurement apparatuses for the quantum.”

It is quite enough that it works as a physiological control circuitry in the human body; there is no need in any functionality other than that, to make it support conscious behavior.

“Last but not least, the question of the mental as opposed to the physical aspect of an experience: Experiences consist of intentionality toward an object, but the physical object is not the only object. There is also a mental object in practically every event of conscious experience. A simple example is when I see a rose I also concomitantly experience some such thought as: I see a rose. And I experience this thought not in the ordinary, public physical space of the rose but in a private, mental space that we call awareness.”

Was it necessary to waste so many words to merely say that humans have self-consciousness? No better understanding is conveyed in all that word jingle anyway.

“The qualia of the primary experience is basically universal, and thus objective in some sense, but secondary subjective”

Being trapped in the opposition of the object and the subject, Goswami is not aware of their synthesis, the product. Any product is both objective and subjective, and hence the above observation would only mean that qualia (whatever is meant by that) are specific products of human activity, rather than some inherent properties of any system.

“and personal qualities arise from secondary-awareness processing – the reflection from the mirror of individual brain memory.”

In the normal language: self-reflection results in higher-order perception, so that perception becomes hierarchical.

#### **4. Raping Experiment**

The way Goswami treats experiment rivals his frivolous interpretation of theory and unscrupulous manner in philosophy. There may be all kinds of experiments reported in all the possible ways – but this does not mean that one should not care for what has been observed and how the results have been obtained.

“It is well known that all attempts by psychologists and neurophysiologists to split the unity of a conscious experience (for example, by surgically splitting the brain hemispheres) have failed.”

Experiment can never measure “the unity of conscious experience”, or any other abstract idea. What kinds of results have been actually obtained with the split brain remains unclear from Goswami’s text.

“then the subjects can see the words only with unconscious awareness (as in Marcel’s experiment). This guarantees that no choice is made after seeing the words, no collapse of the dichotomy, until we ask, and there should be interference.”

Substituting imaginary collapse in place of ordinary choice makes it utterly incomprehensible. In reality, practices like that are quite usual in mass propaganda (brain washing): first make the people form a set using the well-known properties of unconscious perception, then claim the results of a referendum a manifestation of the society’s free will. One does not need to be conscious to have the brain washed; on the contrary, the less consciousness, the higher susceptibility to propaganda.

“This question, I think, can be answered with an even more decisive and objective experiment that can discern between classical and quantum models of the mind.”

To discern between different models, one has to have the models first. Goswami did not suggest any model at all, beyond appeals to mystical revelations, and there is nothing to compare with experiment. Some other authors may have models, but it has yet to be demonstrated that those are the models of the mind, rather than something entirely different.

Anyway, no experiment can help to discern between the models if their authors cannot discern them from each other! The traditional approach is exactly the inverse: take a definite model and check its applicability to a certain class of experiments. There may be many models, for different aspects of the mind, and none of them can be all and only truth.

“Who/what chooses which possibility is manifested in a particular measurement?”

Experiments provide data, and there are only different interpretations to choose. Experimentalists never deal with possibilities, they deal with facts.

“If choice is involved, is consciousness? And if consciousness can collapse the quantum wave,”

Consciousness does not mean choice, and vice versa. And the illogical substitution of “collapse” instead of choice makes any reference to experiment irrelevant.

“The stimulus is processed by the sensory apparatus and presented to the dual quantum system/classical measurement apparatus.”

Why a common stimulus (say, a smell of a rose, or an economic situation in the country) should have to do anything with quantum measurement? There is no quantum system to interact with, and no need to invent one.

“Incidentally, the experiments of neurophysiologist Benjamin Libet and his collaborators (1979) have demonstrated that there is almost half a second of time delay between the primary event of quantum collapse and our verbal awareness of the event.”

There have been thousands of experiments based on latent time measurement, but none of them has ever dealt with any “collapse”.

“Cognitive experiments using polysemous words seem to verify this aspect of the quantum model. In

a representative experiment, Tony Marcel (1980) used strings of three words in which the middle word was polysemous;”

Experiments like that should be interpreted with care. Since any word at all is polysemous in the natural language, individual sets are bound to essentially influence the results. The examinee does not need to have the same notions as the experimentalist, even within the same cultural layer.

“The original purpose of the experiment was to use the subject’s reaction time as a measure of the relationship between congruence (or lack of it) among the words and the meanings assigned to the words in such series as hand-palm-wrist (congruent), clock-palm-wrist (unbiased), tree-palm-wrist (incongruent), and clock-ball-wrist (unassociated).”

The attribution may be considered as arbitrary, since the actual type of association depends on the sets of the examinee, rather than mere dictionary meanings; the latter would obviously provide a trivial background, and it is individual deviations from it that are only meaningful.

“For example, the bias of the word hand, followed by the flashing of palm may be expected to produce the hand-related meaning of palm, which then should improve the reaction time of the subject for recognizing the third word wrist (congruence). But if the biasing word is tree, then the lexical meaning of palm as a tree would be assigned and the meaning-recognition of the third word wrist should take a longer reaction time (incongruous). And indeed, this was the result.”

One could only wonder why such an experiment should be related to any “collapses”. The usual notions of sensibilization and set are quite enough to account for the effect described; Goswami’s “quantum” explanation cannot add anything.

“Suppose we ask subjects to look at a screen on which a polysemous word (such as palm in Marcel’s experiment) is flashed that has two possible interpretations, *A* and *B*. The quantum state of the subjects’ brains would then become a coherent superposition in response to the ambiguous signal, fifty percent for recognizing *A* and fifty percent for *B* (assuming equal probability for the two possible responses to the picture).”

These are all entirely arbitrary assumptions, starting from the attributing quantum behavior to the brain, and up to the necessity of a superposition, and the equality of weights. There are individual and group sets, and one brain does not need to operate exactly like another.

“Then we bring in a new sample of subjects and flash them first the ambiguous word with interpretations *A* and *B*, followed quickly by the one with interpretations *C* and *D*. Only after seeing both words are they asked for their interpretations. Since probabilities are multiplicative, if the probabilities are classical, then the total probability for choosing *C* for all subjects will be:  $5(P_1 + P_2)$ .”

The only approach to explain psychophysical experiments like that is to consider the ways humans behave to produce the answers. That is the key point in any model, and without it all the assertions become nothing but arbitrary assumptions.

“A thorough analysis (McCarthy and Goswami, 1993) shows that, indeed, if the two ambiguous words are shown simultaneously and with a pattern mask, then, due to quantum interference, the recognition times for the target word can be drastically different from what is predicted by connectionist models. Thus this experiment should be able to establish beyond any reasonable doubt the existence of quantum coherent superpositions in the brain-mind.”

Logic is dead. The only conclusion one could draw is that one poor model would produce results different from another as poor model. No “superpositions” are required for such an obvious conclusion, however. No reference to real experiment is remarkable too: imaginary victory over imaginary opponent.

By the way, interference does not imply any quantum effects. Thus, providing close enough stimuli is bound to involve their perceptive or sensory interference, which is a trivial result commonly known (and widely used) since the ancient times.

In general, interference is related to the phase shift between the concurrent processes. Thus, presenting a sample to the examinee starts an inner activity, so that a similar activity caused by another sample may be incoherent or resonant with it, like in the case of two oscillators. No quantum physics (and no physics at all) is needed, since this is simple mathematics equally applicable to phenomena of any nature.

“The recent experiment by the Mexican neurophysiologist Jacobo Grinberg Zilberbaum and his collaborators directly supports the idea of non-locality in human brain-minds – this experiment is the equivalent for brains of the objective Aspect et al’s (1982) experiment.”

Both experiments are based on very hypothetical assumptions, and there may be quite different interpretations, of which those without any mystics are certainly preferable.

“Two subjects are instructed to meditate together for a period of twenty minutes in order to establish a *direct communication*”

If you suggest that kind of instruction to a normal person, it would provoke questions like “What do you mean by meditation?” or “How do we know about establishing direct communication, and what is it, by the way?” That is, the description of the experiment lacks the most important component, a definite experimental procedure. With such a premise, one can obtain anything at all.

“then they enter separate Faraday chambers (metallic enclosures that block electromagnetic signals) while maintaining their direct communication for the duration of the experiment. One of the subjects is now shown a light flash that produces an evoked potential (an electro-physiological response produced by a sensory stimulus measurable by an EEG) in the stimulated brain. But amazingly, in about one in four cases, the unstimulated brain also shows an electrical activity, a *transferred* potential quite similar in shape and strength to the evoked potential. (Control subjects never show any transferred potential 2E) The straightforward explanation is quantum non-locality – the two brain-minds act as a non-locally correlated quantum system. In response to a stimulus to only one of the correlated brains, consciousness collapses identical states in the two brains, hence the similarity of the brain potentials (Grinberg-Zylberbaum et al, 1994).”

The descriptions of numerous experiments like that abound in the books on paranormal phenomena – however, not a single case has ever been confirmed by an independent study. Usually, the essential details are omitted in such descriptions, and unessential details are much dwelt upon to produce the impression of a comprehensive procedure. One has to carefully analyze the experimental set-up to draw conclusions. I can admit that, in the GZ experiment, the subjects were somehow informed about the goals of experiment and techniques used, so that all they needed was just a little synchronization to produce correlated activities. That is, the “transferred potential” was produced as a guess of the other subject, who tried to produce it in synch with the first one. Statistically, such guesses could overlap with the stimulus in 1/4 of all cases, depending on the way of synchronization, which has been prudently omitted in the report.

That is, there is no “quantum nonlocality” and other mythical inventions. The experiment merely confirms that people follow similar ways in their activity, which is the basis of any communication at all and hence has to do with consciousness. If similarly conditioned, the subjects continue their activity “in phase” for some time, until another activity interferes.

Similarly, in physics, a spherical wave emitted from a point source keeps phase correlation in very distant points without any additional synchronization.

Some 27 years ago, I staged many experiments like that with an HP minicomputer, making the subjects guess characters produced by a random number generator. The results were quite similar, and there definitely was no meditation and brain synchronization.

“Clearly, a radical hypothesis is dictated by the experimental data on telepathy, distant viewing, transferred potential, and the like. How can local signals perceived by one observer be perceived also by another, without some other local signals?”

Even provided we believe in telepathy and the like, no non-locality can be considered in this case,

since the observers were never space-like separated, and the typical reaction times overvalued the time of light propagation from one examinee to another by many orders of magnitude.

“Because consciousness may choose to collapse identical possibility waves simultaneously in two correlated locally-separated observers.”

But why does it not choose to “collapse” in the other 3/4 cases?

“There is a striking similarity between correlated brains (as in the Grinberg-Zilberbaum experiment) and correlated photons as in the Aspect experiment, but there is also a striking difference. The similarity is that in both cases the initial correlation is produced by some *interaction*.”

What kind of interaction is there in the GZ experiment? Just thinking together cannot be called interaction.

“But the difference is that in the former case, as soon as the wave function is collapsed by measurement, the objects become uncorrelated; but in the case of the correlated brains, consciousness maintains the correlation over the one-hundred light flashes that are needed to get the average evoked potential.”

The both “explanations” are mystical, and one can assert anything at all about imaginary things.

“Thus the question arises, Is there an unambiguous way to discern between a quantum and a classical computer model of cognition?”

The question is ill-formulated. It assumes that there is something uniform and simple that should be called consciousness and that all the theoretical models should apply to. But this is absolutely inapplicable to human consciousness, since flexibility and versatility are its determinative features! There many facets of consciousness (even Goswami admits that there is a hierarchy), so that different models may apply to different manifestations of consciousness rather than to the same thing. In this case, it is absolutely meaningless to ask which description is the best – all are correct within their limits of applicability. The only scientific question is that of the applicability range; science has never dealt with truth.

“We can take advantage of the fact that the unconscious mind does not choose unless there is an observation with awareness”

A bluntly wrong assertion. There is no such fact, at least because the abstractions like “unconscious mind” have to be properly defined before applying them to any observable phenomenon, and hence one can only speak of interpretations, rather than facts.

“But we can think of a very plausible way to carry out a successful experiment.”

Yes, they can. Just fancy it and swindle the results to conform to any desirable behavior.

## 5. *Pride and Misery*

As one can see, the much pretence Goswami puts into his writings presents a sorry spectacle at a closer investigation. Well, this is in the nature of show business – the only name applicable to what Goswami is engaged in. Shine in the spotlight, and fade in the sun.

“To see how a tangled hierarchy arises in the brain-mind, let us examine a crude model of the brain-mind’s response to an ambiguous stimulus (Goswami, 1993).”

This is an example of a VERY crude model! Up to having nothing to do with reality.

“The differentiation of unconscious and conscious processing: There is now data showing unconscious perception – a subject *sees* enough to act on the basis of it, but is not conscious of the seeing. Unconscious processing is also acknowledged as part of the creative process (Wallas, 1926), and much evidence exists in favor of it (Goswami, 1999). But in material realist cognitive science, it is not easy to formulate a paradox-free distinction between the unconscious and conscious that also agrees with experimental data (McCarthy and Goswami, 1993).”

This pretends to discover something new about consciousness and the unconscious, actually being a

collection of banalities.

“In other words, learning biases the quantum dynamics of the brain-mind and thus reduces the access to its full potentia.”

Fine! If you learn, you risk to reduce you potentia; do not learn, stay ignorant like Goswami – and you will be as potent.

“The alternative is to admit that the neuronal configuration does not provide a complete description of the experience (Goswami, 1994).”

It does not provide any description at all. In particular, no complete description.

“The theory of quantum functionalism above, having addressed the paradox of self-reference, thus also successfully eradicates the paradox of the qualia of experiences. In this theory, the processing of the incoming stimulus involves quantum processes and their amplification at every stage, leading to a macroscopic coherent superposition of possibilities until consciousness supervenes.”

A pompous declaration with no meaning at all.

“Because consciousness of the experience transcends the brain-state of the quantum/classical ensemble,”

Why should it transcend anything?

“the latter is clearly an incomplete description of the experience.”

It is no description at all. It is a myth.

“Yet the subject consciousness of the experience (the subject pole with the qualia of experience) arises co-dependently and tangled-hierarchically with the chosen brain-state (the object pole), both of which exist only as possibility until the collapse, and no dualism is involved.”

Simple admission that people live and act in the world, being a part of it, leads to as comprehensive conclusion, without any additional constructs needed.

“The quantum theory distinguishes between conscious and unconscious perception.”

Pretending that his “quantum theory” incorporates the unconscious, Goswami never gives any actual description, no explanation, or indication to any specific property of the unconscious that would not be a mere reference to what has been empirically discovered long ago.

“But in unconscious (subliminal) perception, in which consciousness but not awareness is present,”

Most psychological conceptions treat the unconscious is a necessary part of consciousness, a level in its hierarchy, which distinguishes consciousness from mere awareness, and humans from animals.

“Unconscious processing is found to be of crucial importance in the creative process, for which a quantum explanation has been given (Goswami, 1999).”

One might think that Goswami refers to some recent discovery made by himself! The role of the unconscious in creativity was a centuries-old banality long before quantum mechanics appeared. And, as one can easily check, Goswami cannot explain anything at all with his mix of pseudo-physics and poor eclectic philosophy.

“However, the situation is different in the present theory. With brain damage, the learned representation of that particular body part is gone. Thus, according to the present model, surprise is natural.”

This is sheer phrenology, to think that mental images could be localized in a particular area of the brain. When one encounters such a primitivism in the end of the XX century, surprise is natural.

“The idea of consciousness self-referentially collapsing both the object pole of the experience and the subject pole, where the quality of the experience lies, also resolves the thorny issue of the oneness of a conscious experience – the idea that we can be consciously aware at any given instant of only one particular thing.”

An attempt to resolve a non-existing problem. The unity of the object and the subject may become a philosophical position, and it was treated by many philosophers in different ways, without any “collapse”.

“In the conventional cognitive-science model of perception, it is assumed that the brain makes a mental representation of a sensory object, an image, which is what we see.”

Vulgar notions of cognitive science interpreted by a vulgar philosopher. We do not see any images, we see objects. The mechanism of seeing is an object too, and it can be rationally comprehended. Also, that the world is reflected by the brain (as by any other body) is not enough for conscious perception.

“ the main problems with the representational model of perception are these:

- (1) The model implies a dualistic homunculus in our head watching the mental representational show offered to it; otherwise, how does the subject-object experience of the watching come about?
- (2) The brain representation of a perceived object invariably involves many brain areas, but the experience of perception is one of unity; we don't perceive all the different aspects of imaging separately, they are all integrated. With local mechanisms alone, it is hard to solve this *binding* problem (Feynman, 1981).
- (3) With a strictly objective model of perception, it is hard to explain the subjective quality of experience referred to as *qualia* by philosophers.
- (4) Still another difficulty is that the image in our brain after processing by the *higher* centers is not an exact replica of the object, and yet, somehow we are able to translate the image into the object, and in such a way as to form a consensus with other observers (although it is by no means clear that what we see in consensus viewing is necessarily the object in its suchness, a point made by the philosopher Immanuel Kant ). As Eccles (1994) notes, how does spatio-temporal neuronal activity in the cerebral cortex evoke a perception of the object in the mind?
- (5) And perhaps most importantly, the mental aspects of perception, the mental representation and associated awareness, thoughts, concepts, and other mental objects are internal and private in contrast to the physical aspect of perception, the external, public object which we share with other people.”

This is a list of common prejudice. Neither item poses any problem for a normal person, who does not doubt the existence of other people and their productive activity in a real world. There is nothing to answer and nothing to discuss. One might only observe that all these items apply to Goswami's writings as well, despite his pretence to suggest anything better.

“Now, the representational model would be more suited if perception is a matter of recognition, not cognition.”

But that is how it is in reality! We perceive our products, and never “raw” sensory stimuli. No wonder, abstract speculations can never guess of productive activity as the material basis of consciousness.

“The breakthrough in pattern recognition by computers came when it was realized that instead of programming computers to cognize a pattern, we can *teach* them to do so.”

This is how sociality enters the game.

“This has been corrected in quantum functionalism in which consciousness is defined to transcend both matter and mind.”

So, what is consciousness? Something indeterminable and transcendental. All one can get from Goswami's “theory”.

“If transcendent consciousness is always looking and collapsing, quantum possibilities would never develop and all the wonderful phenomena of quantum physics that give us the technologies of computers, lasers, and superconductors would be impossible.”

Non-transcendent consciousness is servicing human activities for many years, without collapsing. This gives birth to any achievements of human creativity, and lack of consciousness results in mystical speculations.

### **IN MEMORIAM**

To summarize the three previous sections:

1. Goswami pretends to be a physicist, but demonstrates ignorance in elementary issues of science.
2. Goswami pretends to be a philosopher, but can never suggest anything beyond eclectic mix of statements borrowed from other philosophers without too much concern about consistency and logic.
3. Goswami pretends to explain consciousness. He can add nothing to what was known before, and he can explain nothing at all.

In general, Goswami produces the impression of a person who cannot see any real problem and invents toy problems to solve with imaginary means.

One might ask: why such a profanation of both science and philosophy could receive a relatively wide audience in the world? The natural answer is that it serves the interests of certain social layers that prefer to keep people ignorant rather than educate them.

“But I think the mystical connection is a virtue, for the present development can be used to bridge science and spirituality”

The word “spirituality” is improperly used in place of “spiritualism”. To properly formulate it: religion tries to tame science and make it serve its profit, which strides along with the ruling classes attempting to use science to consolidate their social position. There is a self-consistent mechanism: mass ignorance in science and philosophy makes people unable to distinguish scientific and philosophical works from mere swindling, which makes it easier to control the public consciousness. Poor acquaintance with science and philosophy is intended to inspire a mystical awe in the face of the teachers like Goswami, thus depriving people of true spirituality and hindering development of consciousness:

“This is the idea that I (Goswami, 1990) have adapted into an idealist model of consciousness, quantum measurement, and self-reference called quantum functionalism.”

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